

August 1989

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Archive

The Subscription Magazine for Archimedes Users

Acorn User Show Report / ARM 3 news

MS-DOS Column (really does) reappear!

RISC-OS Graphics / ANSI C release 2

BASIC Compilers compared

9 pages of Hints and Tips / The 6502 emulators

Reviews: GraphBox, Noah Paint Professional,
Shareware Nº9, Arcendum, Designer Intro,
Jet Fighter, PC Shareware.

Another issue of Archive...

Well, yes, it's another issue of Archive, so what? Nothing, really! Just that it gives me time to stop and think (very briefly) about all that goes into producing it.

I am so grateful to the many folk who write for Archive as a labour of love. In particular, I want to mention Mike Hobart and Ken Biddle, both of whom have been forced by circumstances to stop writing for us. They were both so apologetic about having to stop but really it is us who should be thanking them. There are many folk who have been helped by them – both through their writings in the magazine and also through personal contacts. So, on everyone's behalf, I want to say a very big "Thank you" to them both.

Thanks also to all those who are willing and able to continue writing programs and articles for us. A lot of man (and woman!) hours go into each and every Shareware, Careware, program disc and magazine. Thanks to you all, Archive continues to flourish and, as I have written elsewhere in the magazine, we have already raised well over £1,000 for charity and really, we've hardly started – there's lots more we can, and will, do.

Paul's sob story...

From my own point of view it means a lot of hard work. Take last night for instance (or was it this morning?) – today, we are due to go on a week's holiday in sunny Southwold, so the magazine had to be finished. What happened yesterday, Friday? Well, when I had finished editing the very last article and started trying to paste it all together, I discovered that all the files created in the new version of Microsoft Word that I'd recently purchased would not, for some reason, paste into Pagemaker – "Illegal file format", it said! Despite all my best efforts, no way would it accept them. What is more, those same files wouldn't go back into the old (compatible) version of Word except as **pure text**. So at 8.00 p.m. (and it was our wedding anniversary!) I started re-formatting the whole magazine! I haven't had a lot of sleep since then and I have done some desperate praying, but believe me, it works. It's 9.00 a.m. and I'm just putting the finishing touches to the magazine. (This is always the last bit I write, even if it's the first bit some of you read!) There's no doubt in my mind where I got the strength to do it. And I think Him for it!

More criticism, please!

I know that there are one or two of you who agree with Mark Barr's assessment of the current state of the magazine, but from all the very positive comments we got at the Acorn User Show (for which, thanks) I believe that the silent majority are happy with the way we do things. Keep the (constructive) criticism coming – a bit of controversy helps to liven things up!

The only thing I would ask is that you remember that most of the folk involved with Archive do it for love, not to make money. I'm the one to accept the criticism if you don't feel you're getting value for money. If you really do feel you're not getting your money's worth, we will happily give you a pro-rata refund for any outstanding issues of the magazine.

Hope you have a lovely summer!



P.S. I've just realised, having had a letter addressed to "Paul B." that nowhere does it say who edits this magazine! Ooops! My name is Paul Beverley, sorry!

Archive

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Products Available

• **Armadeus sound sampling software** from Clares Micros, as described in Archive 2.9, page 17, is now available – £79.95 or £70 through Archive.

• **Careware Discs N°s 2 and 3** are now available at £6 each – N°2 includes: Asteroids, Maxgammon (a commercially available backgammon game now donated to the public domain), Fractal curves, Desktop Calendar, ARM disassembler, Disc editor (ADFS & MS-DOS), Icon for BASIC editor, BASIC program compressor. N°3 includes: Breakout, Fruit machine, 3D O&X's, Forth language, Hard Disc backup, Graphical file dump, 'Examine' for MS-DOS, and (another) Icon for BASIC editor.

• **Shareware Discs N°s 12 and 13** are also now available at the usual £3 each. We abandoned the idea of doing a specific RISC-OS update disc and decided instead to slot them in amongst the other excellent programs. (N.B. These two discs are RISC-OS only.) Those programs with a (u) are upgrades of previous programs. So N°12 contains: Descent to Xeer, Rubik's cube, *settype and *stamp files from the desktop, BASIC compressor (u), Sinclair QL disc reader, Calculating your central heating requirements, Making cassette inlays (u), Test your floppy drive speed, Address book (u). N°s 13 contains: Utilities: (another) Hard disc backup, Rubik's clock, Interrupt module (u), Dustbin, Outline processor, Mandelbrot (u), Video database (u), Calendar, Golf (u). (Other programs for later Careware/Shareware discs include: Fourier transform movie, Labyrinth, Fortune Cookies, Astronomy (u). Check the price list to see if we've got Shareware N°14 done yet!)

• **Colour Dump for LC10** – Musbury Consultants have added to their range of colour dumps by providing one for the Star LC10. The cost is £30 (or £25 through Archive) and it provides three sizes of dump: 7.6" x 6", 9.45" x 7.6" and 19" x 15.2".

• **Graphics Library** from Micro Studio comes in two formats, one for First Word Plus and one for use with Acorn's new DTP package. Either set costs £17.25 inc VAT and p&p. Also available is a colour graphics library at £19.95 for use with any RISC-OS application.

• **SCSI Hard discs** – Two suppliers (at least) are providing SCSI interface cards for the A310 and the A3000: Oak Computers and Lingenuity (Lindis International). Prices of the Lingenuity drives are as follows (all excluding VAT): A3000 card only: £149; A310 card only: £199; A3000, 20 Mbyte (external) + card: £475; A310, 45 Mbyte (internal) + card: £499. (They will quote for other sizes. Please ring them for details.)

Oak Computers quote a wider range: For the A310 you can buy a controller card with an internal drive: 20Mb: £375, 45Mb: £495 or 70Mb: £895. You can also add one of their external drives: 20 Mb: £435, 45 Mb: £555, 70 Mb: £955, 100 Mb: £1350, 200 Mb: £1750, 330 Mb: £2300. For the A3000, you can buy a card on its own for £199 or alternatively, you can buy a controller together with an external drive, the prices being £100 more than the straight external drives you would use with the A310, e.g. 20 Mb: £535, 45 Mb: £655, 70 Mb: £1055 etc. If you would prefer to have a controller card and an external drive for the A310, or for a 400 series machine, for that matter, the prices are exactly as for the A3000: £535, £655, £1055 etc.

If you want any of these drives, either from Oak or Lingenuity, we can supply them to Archive members at a discount. If you are interested, give us a ring and we'll work out some details.

Any of the SCSI drives quoted for the 310 could be used in the 410, though you would still need the SCSI podule since the existing disc controller is for ST506 standard hard drives. Similarly, they can be added to 420/440 machines but you must obviously use the external drives. The advantage of using SCSI drives is that you can have up to four different hard drives on the one system each up to 512 Mbyte capacity! ("Oh, I use an A410 with 2 Gigabytes of hard disc storage." How's that for one-up-man-ship!) The other advantage of SCSI is that you can daisy-chain other devices on it such as tape-streamers and video discs (once the software is written to control them). Also, Oak computers claim that SCSI drives are faster than ST506, but until we have done our disc tests, we cannot substantiate that claim.

- **Termulator** from Intelligent Interfaces is a terminal emulator providing VT52, VT102, VT202 and Tektronics Graphics terminals for £59 + VAT.
- **"ARM Assembly Language Programming"** by Pete Cockerell. Yes, I know this was the very first ARM book available and that it was on the market even before the Archimedes itself and, yes,

I know it is now out of print. However, Bookmark Publishing Ltd have taken it on from M.T.C. (alias Computer Concepts) and are revising it and updating it by putting in more details about ARM3 and RISC-OS. Price £13.95, due for release in September. (Yes, I know that it should be in the Forthcoming Products section, but this is the only entry this month, so I cheated.) **A**

Hints & Tips

- **Limited ADFS memory (RISC-OS/Arthur 1.2)** – One reader has written in saying that his Archimedes will only *MOUNT six discs. On the seventh, the drive spins continuously until the disc is removed. This happens because the ADFS only has a limited amount of memory to store the directory information. The amount of memory allocated for this can be controlled by using *Configure ADFSDirCache.

```
==> Help on keyword ADFSDirCache
*Configure ADFSDirCache sets the
size of the directory cache (in
Kbytes) used by the ADFS. A value
of 0 selects a default value
which depends on RAM size.
Syntax: *Configure ADFSDirCache
<size>[K]
```

You can also make the Archimedes forget that it has seen the disc by using *DISMOUNT.

```
==> Help on keyword Dismount
*Dismount closes files, unsets
directories and parks the given
disc.
Syntax: *Dismount [<disc spec.>]
```

- **Three floppies for Arthur 1.2 desktop** – In Archive 2.8, pages 11/12, there is a hint which allows you to access three drives from the desktop. However, the hint states that you must start the desktop up by typing */Desktop instead of *Desktop. One reader says that you could of course set up *Set Alias\$Desktop Run Desktop which would then allow you to start up using *Desktop.
- **In First Word Plus**, when printing after opening more than one file, the first file you opened will be offered for printing, not the last one you closed!

- **Configuring your printer under the PC Emulator** – In reply to Chris Walker's question, you must use the following reserved words when configuring your printer:

For serial printers use: AUX or COM1, COM2, COM3...

For parallel printers use: PRN or LPT1, LPT2...

- **Sprite Plot comments from Martin Simmons** – The article on sprite plotting was interesting since it is always good to see how other programmers solve problems. However, the routines are far from being the fastest possible, a major inefficiency being that the screen pointer is updated after every pixel is plotted. This could be rectified by deleting 2410, 2460, 2510, 2580 and changing the following:

```
2010 PROCplot_4_pixels(4*
                                (gjenta-1))
2050 ADD screen_pointerR,
                                screen_pointerR, #320
2110 DEF PROCplot_4_pixels(index)
2400 STRNEB data5R,
                                [screen_pointerR, #index+0]
2450 STRNEB data5R,
                                [screen_pointerR, #index+1]
2500 STRNEB data5R,
                                [screen_pointerR, #index+2]
2570 STRNEB data5R,
                                [screen_pointerR, #index+3]
```

Now the pointer is only changed at the end of each line. This improves performance over the published routine by about 10% for a 24x24 pixel sprite with no black pixels.

It would be quicker to use word stores instead of byte stores but this would complicate the routine and may even slow it down overall.

• **D.I.Y. A3000 serial interface** – Mike Harrison (Archive 2.10 p 56) didn't know what the chip numbers were for the A3000 serial interface kit. You need a 6551 (which ought to be one of the ones manufactured by CMD) and an LT1133.

• **Evaluation of Algebraic Expressions** (E.D. Engelhardt) – Anyone who is interested in the evaluation of valid algebraic expressions could try to use PROCexpression in program Evalexpr as given below. The procedure mentioned has been written using suggestions of Mr de Heus, ECD, Delft, Holland.

Variable names in an expression are single, lower-case characters ranging from 'a' to 'z'. These names are stored in 'var\$'. Each character in the input expression 'ex\$' is matched with its presence in 'var\$'. If so, its position in 'var\$' is detected and it is replaced by the (arbitrary) character '\$'. The position is used to assign an appropriate value to the actual variable by means of array 'var()'. The value of the expression is obtained using the EVAL function.

The reason EVAL(ex\$) is preceded by EVAL("FALSE") in PROCevalexpression is as follows: If one enters an expression containing no variables but numbers only, and the expression cannot be evaluated (e.g. LN0 or 3/0) an error message appears on the screen. Thereafter, entering the same type of expression, again not containing variables (e.g. LN9 after LN0 or 6/5 after 3/0), results in the same error message. To prevent this from happening the instruction EVAL("<") is included. I discovered this 'feature' by accident and found the solution by trial and error. I would appreciate any comments from interested readers.

```
10 REM >Evalexpr
20 :
30 WHILE TRUE
40   PROCevalexpression
50 ENDWHILE
60 END
70 :
80 :
90 DEFPROCevalexpression
100 k$=" Press any key to continue !"
110 LOCAL ERROR
```

```
120 ON ERROR LOCAL IF ERR=17 THEN
    PRINT"" *** Escaped program !""
:END ELSE PRINT"" ";REPORT$'k$;;
        dummy=GET:ENDPROC

130 :
140 PROCinput
150 :
160 PROCexpression
170 exval=EVAL("FALSE") :REM
    *** To prevent error message
        after evaluation of a wrong
        expression, e.g. LN0. Try to
        REM this line !

180 exval=EVAL(ex$)
190 :
200 PROCoutput
210 ENDPROC
220 :
230 DEFPROCinput
240 CLS:PRINT"" Choice of variables
        from a to z.""
250 LINE INPUT" Give expression : "
        ex$

260 ENDPROC
270 :
280 DEFPROCoutput
290 PRINT"" Function value of ";ex$
        ;" = ";exval
300 PRINT'k$;;dummy=GET
310 ENDPROC
320 :
330 DEFPROCexpression
340 LOCAL var$,var(),t%,i%
350 var$="abcdefghijklmnopqrstuvwxyz"
        xyz"

360 DIM var(LEN(var$))
370 :
380 FOR t%=1 TO LEN(ex$)
390   i%=INSTR(var$,MID$(ex$,t%,1))
400   IF i%>0 THEN
410     var$=LEFT$(var$,i%-1)+"$"
        +MID$(var$,i%+1)
420     PRINT"" Value of ";
        MID$(ex$,t%,1);" : ";
430     INPUT""var(i%)
440     :
450     CASE i% OF
460       WHEN 1:a=var(i%)
470       WHEN 2:b=var(i%)
```



```

480      WHEN 3:c=var(i%)
490      WHEN 4:d=var(i%)
500      WHEN 5:e=var(i%)
510      WHEN 6:f=var(i%)
520      WHEN 7:g=var(i%)
530      WHEN 8:h=var(i%)
540      WHEN 9:i=var(i%)
550      WHEN 10:j=var(i%)
560      WHEN 11:k=var(i%)
570      WHEN 12:l=var(i%)
580      WHEN 13:m=var(i%)
590      WHEN 14:n=var(i%)
600      WHEN 15:o=var(i%)
610      WHEN 16:p=var(i%)
620      WHEN 17:q=var(i%)
630      WHEN 18:r=var(i%)
640      WHEN 19:s=var(i%)
650      WHEN 20:t=var(i%)
660      WHEN 21:u=var(i%)
670      WHEN 22:v=var(i%)
680      WHEN 23:w=var(i%)
690      WHEN 24:x=var(i%)
700      WHEN 25:y=var(i%)
710      WHEN 26:z=var(i%)
720      ENDCASE
730  ENDIF
740 NEXT
750 :
760 ENDPROC

```

• **First Word Plus** – I am sure that all users of First Word Plus have found it considerably enhanced by the use of Steve Hoare's Interrupt Module (available on Shareware N^o6). The main use for this is in mounting new discs, formatting and creating directories. I have recently discovered that it can also be used for *EXECing files into the word processor. This can be very useful because First Word Plus treats the standard ASCII space character as a 'hard' space. This means that if straight ASCII text is read into First Word Plus in the regular way it can not be formatted because each line is treated as an entire word. By using the interrupt module and *EXECing the file it is as if it were being typed in from the keyboard. Spaces between words are thus translated into 'soft' spaces so that the resulting document can be formatted in the usual way. Brian Cowan

• **Greek characters** – (Gerald Fitton) For some time now I have been considering converting all my old Wordwise files to PipeDream files. The thing that has been putting me off is that, since I teach (amongst other things) maths and statistics, I need to be able to print Greek letters such as ΧΔΣΨαβχ δεφγηικλμνοπθρστυωξψ. It is relatively easy from Wordwise to define a new character on the Epson FX printer, but not so easy to include it in PipeDream's Printer On string. I have got round this by running a BASIC program from within PipeDream's !Run file that sends the necessary codes for the Greek characters to the printer. You can then have What-You-See-Is-What-You-Get Greek characters on screen by using the sequence <Alt>+E+C. This is what you do:

Modify the !Run file to include the command

```

BASIC -quit "<PipeDream$Dir>.
Printers.Greek"

```

My !Run file now looks like the one below.

```

| > !PipeDream.!Run
Set PipeDream$Dir <Obey$Dir>
WimpSlot -min 160k -max 640k
RMReInit InternationalKeyboard
RMKill InternationalKeyboard
BASIC -quit "<PipeDream$Dir>.
Printers.Greek"
RMEnsure FPEmulator 2.60 RMLoad
<System$Path>Modules.FPEmulator
Set Alias$@RunType_DDE Run
<PipeDream$Dir>.!Run %*%0
Set File$Type_DDE PDream
IconSprites <PipeDream$Dir>
.!Sprites
Load <Obey$Dir>.piped.pd 8000
DIR <Obey$Dir>
Echo <26>
Pointer 0
Go 8000 ; %*%0
DIR adfs::HardDisc4.$

```

Include the new program 'Greek' in a suitable directory; I have chosen the 'Printers' directory.

```

100 REM > <PipeDream$Dir>.
Printers.Greek
150 :
160 *Alphabet Greek
180 VDU 2

```



```

200 RESTORE
210 REPEAT
220 READ byte%
230 IF byte%<>-1 THEN VDU 1,byte%
240 UNTIL byte%=-1
250 :
260 VDU 3
270 :
280 END
300 :
310 DATA 27,64
320 DATA 27,58,0,0,0
330 DATA 27,37,1,0
340 DATA 27,54
350 DATA 27,38,0,108,108
360 DATA 136,0,128,0,252,2,0,2,0,0,0,0
370 DATA 27,38,0,128,128
380 DATA 138,8,4,2,4,8,16,32,64,128
,0,0
390 DATA 27,38,0,176,176
400 DATA 168,0,0,64,160,0,160,64,0,0
,0,0
410 DATA 27,38,0,177,177
420 DATA 139,18,0,18,0,126,0,18,0,18
,0,0
430 DATA 27,38,0,195,196
440 DATA 137,130,124,130,0,128,0,128,
64,0,0,0
450 DATA 139,2,4,10,16,34,64,130,96,
26,4,2
460 DATA 27,38,0,211,211
470 DATA 139,130,0,198,0,170,0,146,0,
130,0,0
480 DATA 27,38,0,217,217
490 DATA 139,58,68,130,0,128,0,130,68
,58,0,0
500 DATA 27,38,0,225,249
510 DATA 138,28,34,0,34,20,8,20,32,2
,0,0
520 DATA 138,127,128,18,128,18,128,
114,12,0,0,0
530 DATA 11,64,0,64,32,16,11,4,8,16
,96,0
540 DATA 138,12,18,64,178,0,146,0,
146,76,0,0
550 DATA 137,8,20,8,34,8,34,8,34,0
,0,0
560 DATA 8,13,144,37,192,5,130,0,0,0
,0,0
570 DATA 10,64,60,64,0,64,0,64,63,0
,0,0
580 DATA 138,56,68,16,130,16,130,16,
68,56,0,0
590 DATA 71,0,0,124,0,4,0,0,0,0,0,0
600 DATA 138,62,0,8,0,20,0,34,0,0,0,0
610 DATA 136,130,68,40,16,8,4,2,0,0
,0,0
620 DATA 10,127,0,4,0,4,0,4,120,4,0,0
630 DATA 10,64,32,16,8,4,8,16,96,0
,0,0
640 DATA 9,128,40,212,0,149,0,149,2,0
,0,0
650 DATA 139,0,0,0,0,0,0,0,0,0,0,0
660 DATA 138,32,0,62,0,32,0,62,0,32
,0,0
670 DATA 9,63,64,0,68,0,68,56,0,0,0,0
680 DATA 139,0,0,0,0,0,0,0,0,0,0,0
690 DATA 139,28,34,0,34,0,34,28,32,0
,32,0
700 DATA 10,32,64,0,64,60,64,0,64,0
,0,0
710 DATA 9,64,56,4,0,4,0,120,0,0,0,0
720 DATA 10,56,68,0,68,187,68,0,68,56
,0,0
730 DATA 9,65,34,20,8,20,34,65,0,0
,0,0
740 DATA 11,120,4,0,4,251,4,0,4,120
,0,0
750 DATA 138,28,34,0,2,12,2,0,34,28
,0,0
760 DATA -1

```

Incidentally, this shows how you can include a BASIC program within an Obey file and then come back to RUN the rest of the Obey file.

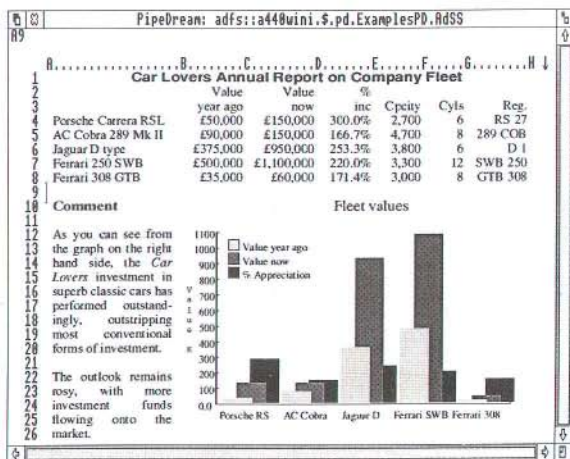
You have to remember to remove ESC "@" from the Printer On string otherwise you will lose all the character definitions you have just downloaded! G L Fitton.

This final section of hints and tips has been extracted from the Archive Bulletin Board Service (BBS) by Richard Forster.

(N.B. There may be some over-lap with other H & T, but I don't have time to edit it out - I'm just off on my Holidays. Ed.)

- **First Word Plus Margins** - It is possible to get First Word Plus to change its margins permanently, but it is not easy. It may also depend on your version of the software, and this method may not work on all versions. Make sure you try it on a backup copy!

PIPEDREAM 3



PipeDream 3 breaks down the barriers between word processor, spreadsheet and database. You can include numerical tables in your letters and reports, add paragraphs to your spreadsheets, and perform calculations within your databases.

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All trademarks acknowledged. The chart in the screen shown above was produced by sending numbers from PipeDream 3 to Linguist's Presenter 2 and then loading the resulting graph back into PipeDream 3.

Colton Software, Broadway House, 149-151 St. Neots Road, Hardwick, Cambridge, CB3 7QJ, England.

Fax. 0954 211607 Tel. 0954 211472

```

10 wp%=OPENUP("Resources.lwp.lwp")
20 margin%=8 : REM or whatever is
                    required
30 PTR#wp%=&2EF9C
40 BPUT#wp%,margin%
50 CLOSE#wp%

```

• **Taxan Multisync juddering** – If you have an A400/1 or A3000 machine and are using it with a Taxan Multisync monitor, you may experience some juddering which can be overcome thus:

A400/1: Fit a molex shunt to link 2. If you do not have a spare shunt, you can request one from Acorn Customer Services.

A3000 : Take your machine to your local dealer. The modification is different from the A400/1 machines and you must not open your machine.

• **Using the Yes/No mouse icon** – In order to use the Yes/No mouse icon, do:

```
SWI "OS_Confirm"
```

This changes the pointer shape, flushes the mouse buffer, waits until a key is pressed and then, on exit: R0 = (lowercased) character pressed, C flag is set if ESCAPE, Z flag set if character is 'Y'

• **Saving Rom Sprites** – To save rom sprites as a standard file, do:

```

SYS"Wimp_BaseOfSprites" TO roms%
SYS"OS_SpriteOp", 524, roms%, "filename"

```

Save this as a BASIC program and double click it from the desktop.

• **Memory Re-allocation** – You can re-allocate memory for spritesize, screensize etc. by loading a module called MEMALLOC. This can be found on Application Disc 2 in directory \$.!Lander.

• **Hourglass** – The following SYS calls affect the hourglass. Note that the hourglass is nested, so if you have turned it on twice it must be turned off twice.

```

SYS"HourGlass_On" – Display Hourglass
SYS"HourGlass_Off" – Remove Hourglass
SYS"HourGlass_percentage", number –
    Display Hourglass & percentage below.
SYS"HourGlass_Smash" – Remove all
    hourglasses

```

```

SYS"HourGlass-LEDs", %AB – Where A is
    the top LED, B is the bottom LED
SYS"HourGlass_On" has a delay of 1/3 sec
    before actually appearing. To make the
    delay the value of r0 use:
SYS"HourGlass_Start"

```

• **Tiny directories** – The adjust button on a tiny directory opens the application and removes that tiny directory.

• **RISC-OS Speedup** – The following calls speed up the machine ROMs from 4Mhz to 8Mhz. Try them at your own risk. (Although under Arthur they caused crashes, they seem to work OK under RISC-OS) The first switches to higher speed, the second resets it:

```

SYS"OS_UpdateMEMC", 64, 64
SYS"OS_UpdateMEMC", , 64

```

• **Terramex Cheat** – For infinite lives, when you first load the game, type in "SUBJECTTOCHANGE" on the loading screen.

• **RISC-OS Bugs** – Yes, already folk have found begun to find bugs in RISC-OS.

1) Module files which show up for *cat as modules but are dated 2:27 1901 do not get a module icon in a filer window – this is a property of unstamped files from AASM/OBJASM.

2) Edit does not work properly in modes 2,4 or 5. (*But who would want to do so?! Ed.*)

3) You can drag a directory into itself creating an copy within a copy until disc space runs out. (*Could that be the answer to the 'library virus' in the Help!!! section? Ed.*)

4) Resizing the interactive help window can cause the mouse pointer to move autonomously up the screen. Try it: Hold button down and resize it, keep holding, and it will go for a certain window size always.

• **MaxGammon under RISC-OS** – If you have a copy of this game, the author has a version which works in the desktop. Send your original disk and a S.A.E. to 11 Maryland, Barkham, Wokingham, Berkshire RG11 4PB and you can have an upgrade to the newer version.

• **Last line in program** – To find the last line in a BASIC program which is in memory, hold down <ctrl>+<shift> and then press <escape> twice.

• **Hearsay Problems** – It is still possible to select a route from the screen when in a scrolling terminal, but it must be a 'long' click. A short click tries to home the cursor to where the pointer is by sending a string of control codes. The answer is to hold the button down a bit longer or use the keyboard.

If you have problems with Xmodem make sure that Vasscomm is turned off.

• **Filer_OpenDir** – When using Filer_OpenDir, it is important to get the full pathname correct. For instance, if your hard disc has the name 'Fred' and

you want to open the directory \$.Foo, you should use:

```
*Filer_OpenDir adfs::Fred$.Foo
```

and not something like:

```
*File_OpenDir adfs::4.Foo
```

The reason is that when you click on the drive icon, the Filer checks the list of open windows to see if the requested pathname is already visible. Unfortunately it is not too intelligent about this, and if the names do not match exactly, the Filer will open another window. This will have the side effect that when Dismount is used only windows with the first pathname will be closed. **A**

RISC-OS Hints & Tips

• **Legal Text Scaling for Multisyncs** – Richard Averill's hint last month (Archive 2.10 pp 19/20) to help rescale text in multisync modes could be done more legally using:

```
VDU 23,17,7,flags,x;y;0,0
```

flags => bit 0 = not implemented

bit 1 = 1 => set size of VDU 5 characters

bit 2 = 1 => set size of VDU 5 spacing

```
10 REM > CharSize Demonstration
   of changing character size
20 REM By Martin Simmons 10/07/89
30
40 MODE 12
50
60 VDU 5:CLS:PRINT''
70 GCOL 1
80 PROCprint(8,16,"Double height")
90 PRINT
100 GCOL 2
110 PROCprint(16,8,"Double width")
120 PRINT
130 GCOL 3
140 PROCprint(16,16,"Double size")
150 PRINT
160 GCOL 5
170 PROCprint2(8,8,16,16,"Double
   spaced")
180 GCOL 7
190 PROCprint(8,4,"Mangled half
   height")
```

```
200 PRINT''
210 GCOL 6
220 PROCprint(120,120,"BIG")
230 VDU 4
240 END
250
260 DEF PROCprint(X%,Y%,text$)
270 VDU 23,17,7,6,X%;Y%;0,0
280 PRINT text$
290 ENDPROC
300
310 DEF PROCprint2(X%,Y%,sx%,sy%,text$)
320 VDU 23,17,7,2,X%;Y%;0,0
330 VDU 23,17,7,4,sx%;sy%;0,0
340 PRINT text$
350 ENDPROC
```

• **ARM assembler T option** – Martyn Lovell says that although the assembler sees the T option for the LDR mnemonic the same as the ! option (Archive 2.10 p 9), it is not used in the same way. The ! option should be used to force write back with pre-indexed addressing while the T option should be used with post-indexed addressing to cause the -TRAN pin on the ARM to go low for the duration of the data transfer. This is used by an OS in non-user modes to allow the OS to generate a user-mode address.

• **ALternative keys** – The RISC-OS InternationalKeyboard module provides the facility for typing control characters by holding down <alt>

and typing the number on the numeric keypad. In addition, the following keys produce symbols when pressed with <alt> held down:

1 gives ¹ 2 gives ² 3 gives ³ ~ gives ~
 9 gives ± 0 gives ° , gives X . gives +
 R gives ® Y gives ¥ S gives § Z gives «
 X gives » C gives ¢ M gives µ
 shifted C gives ©

Other keys return nothing. The old Arthur effect of using <ctrl><shift><alt> to add 128 to the code can be produced by RMKILLing this module. Doing this will also allow the use of <alt> plus a cursor key in the BASIC Editor which does not work with this module installed.

• **Colour cursor for the BASIC Editor** – Here is a little program which will alter the ArmBE module so that you can change the colour of the cursor.

```
10 REM > ColourEdit Make a colour
   cursor for the BASIC Editor
20 REM By Martin Simmons 11/07/89
30 REM I use yellow background,
   blue foreground, red cursor
   (1=6 EOR 7)
40
50 colour%=6 :REM **** CHANGE
   THIS LINE TO CHANGE THE
   COLOUR (EOR 7) ****
60 DIM buf% &10000
70 OSCLI "Load :App2.Modules.
   BasicEdit "+STR$~buf%
80 P%=buf%+&81E4
90 [ SWI &100+colour% ;Change
   background palette
100 ]
110 zi%=buf%+&8320:zi%+=8+4*
   ((!zi%<<8)>>8)
120 wind%=buf%+&8310:wind%+=8+4*
   ((!wind%<<8)>>8)
130 P%=buf%+&8310
140 [ SWI "OS_Writes"
150 EQUB 17 : EQUB 128+colour%
   ;Set background colour
160 EQUB 12 ;Clear screen
170 EQUB 23 : EQUB 16 : EQUB 1
   ;Set cursor movement
```

```
180 EQUB STRING$(4-(P% AND 3)
   ,CHR$0)
190 BL zi%
200 BL wind%
210 ]
220 INPUT "Enter new file name for
   the editor: "file$
230 OSCLI "Save "+file$+" "+STR$
   ~buf%+" +94B4"
240 OSCLI "SetType "+file$+" FFA"
```

• **Wild card copy for RISC-OS** – The destination parameter of the *Copy command now has greater freedom regarding wild cards i.e. wildcards in the destination can be used even though they were not used for the source

e.g. *COPY :0.Text :1.* is now valid.

• **RISC-OS disc names** – It is possible to set a system variable which will behave like a disc name. If you *Set <discname>\$Path <filepath> you can then access you files by :<discname>.<filename>. For example:

```
*Set W Appl:$.
```

```
*Run W:!Edit
```

You can even define several paths, just like File\$Path and Run\$Path:

```
*Set W Appl:$.,App2:$.
```

```
*RMLoad W:Modules.BasicEdit
```

```
*Run W:!Edit
```

• **Memory Usage** – Gerald Fitton – Of course, the 'best' machine has both hard disc and 4Mb of memory, but some hard disc machines have less memory. If you have the 'best' then you will probably put all the !(application) directories that you use in your root (\$) directory for instant access. When you click on the :4 icon in the icon bar, all your application !Boot files will be RUN and memory will be allocated to each application (so that it is instantly available). This is true even when the applications are not installed on the icon bar. If you have less memory, say 1Mb, then you may find that your dormant applications are using up too much memory for some of the more sophisticated applications. The solution is to put your applications not in the root directory but in a (non-!) sub-directory. For example, !Patience can be put

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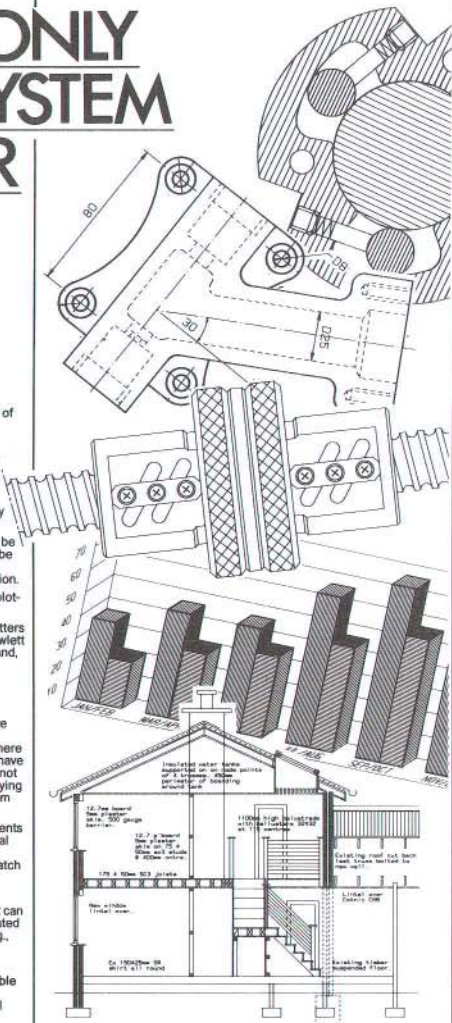
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together with !Zarch in a games directory, where Games is in the root directory. This way, only when you open the Games directory (by double clicking on it) will you use up memory on the dormant applications !Patience and !Zarch.

• **1st Mail solution** – When using 1st Mail in RISC-OS, the printer options are hidden underneath another window. Mr Burrows has solved the problem by altering the template file:

```
*Load $.Resources.lwp.  
                                1ml_templa 9000  
!  
!&9AA8=155  
!  
!&9AB0=1023  
*Save $.Resources.lwp.  
                                1ml_templa 9000+AEA  
*SetType $.Resources.lwp  
                                .1ml_templa FFF
```

• **RISC-OS Hints and Tips – S C Costin** – When using !PrinterDM on the Desktop to print a text file, if the printer and Archimedes are set up where there are no ignore characters configured, i.e. can be checked as follows:

```
FI2          ;Press function key 12 from desktop  
*status ignore ;Enter command  
No ignore    ;Returned after entering command
```

The problem is that the line feed is suppressed and therefore over-printing occurs. This is easily overcome by clicking on the !PrinterDM icon on the icon bar, which produces a window, and selecting CR or LF conversion.

A more permanent solution is to edit the file PrData. To do this hold shift key while clicking on the application directory !PrinterDM, then drag PrData icon over Edit icon on the icon bar and release the mouse button. At the end of the printer driver data change line: from 0 to 1 i.e. change line:

```
0;0/1 1=>convert CR or LF to CR,LF  
to:
```

```
1;0/1 1=>convert CR or LF to CR,LF
```

• **Pipedream conversion to ADFS E type floppy disc** by S C Costin

- 1) Format new disc using the new E format.
- 2) Name the new disc NewPd.

3) Backup your original copy to the disc NewPd, using *COPY to retain E format.

4) Copy the !PipeDream application from the support disc to the root directory of disc NewPd.

5) Copy the Floating Point Emulator module from directory !System.Modules on Application Disc 1 into directory \$.!PipeDream on disc NewPd.

6) Delete \$.!boot

7) Delete \$.piped.fpe2

8) Delete \$.rs423drive

9) Add the following obey file called \$.!boot

```
| > $.!boot  
*quit  
RUN $.!pipedream.!run
```

10) Leave the !PipeDream.!boot file as copied from the support disc.

```
| > !PipeDream.!Boot  
Set PipeDream$Dir <Obey$Dir>  
Set Alias$@RunType_DDE Run  
    <PipeDream$Dir>.!Run %*0  
Set File$Type_DDE PDream  
IconSprites <PipeDream$Dir>  
                                .!Sprites
```

11) If mouse cursor control is required insert lines 7 & 8 in the !Run Obey file as follows:

```
| > !PipeDream.!Run  
Set PipeDream$Dir <Obey$Dir>  
WimpSlot -min 450k  
||RMReInit InternationalKeyboard  
RMkill InternationalKeyboard  
RMensure FPEmulator 2.60  
RMLoad <Obey$Dir>.FPEmulator  
$.piped.cursorrm  
mousecursor on 13 &c5 131  
Set Alias$@RunType_DDE Run  
    <PipeDream$Dir>.!Run %*0  
Set File$Type_DDE PDream  
IconSprites <PipeDream$Dir>  
                                .!Sprites  
  
Load $.Library.pd 8000  
Echo <26>  
Pointer 0  
Go 8000 ; %*0
```

• **Update for Artisan and ProArtisan** – Clares have now produced an application which will update your Artisan and ProArtisan discs for RISC-OS. It has been put on both this month's and last month's program discs. Many thanks to Duncan Burbridge, Kimba, Australia (age 12) who also sent us information on updating Artisan for RISC-OS.

• **Not enough screen memory?** – If a program expects to run in a specific screen mode and not enough screen memory is available, it will usually report a 'Bad Mode' error when run from the desktop, as the screen memory can't be expanded dynamically once the application has started. This can be fixed by either dragging the screen memory bar in the task window, or by entering the appropriate mode first. A much more elegant way is to add the following line to the Obey file that starts the

program: `Echo <22><n>` Where <n> is the mode. This ensures that the screen memory is allocated before the application starts and should appear before the *WimpSlot command.

• **Uncluttered cataloging** – RISC-OS has a neat way of searching a disc without cluttering the screen. Use <adjust> to open a directory and it closes the one you were in, leaving only the new directory on the screen. To move back up the tree, click <adjust> on the close icon, and the next directory up will appear, closing the current directory (unless you are in the root directory, of course!).

• **Bye bye hard disk!** – The RAM disc is fantastic but not much use on 1 Mbyte machines. Also, note that when RAMFS is selected *bye does **not** park the head of the Winchester – so beware!!! **A**



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Help Needed!!!!!!

• **5.25" Disc problems** – Mr B G Meaden of Sutton Coldfield has problems using 5.25" discs with his Beebug interface, PC Emulator and RISC-OS Archimedes i.e. it worked under Arthur but not RISC-OS. Has anyone else had similar problems, and is there a solution?

• **DataChat modem** – Mr P Lee, 2 Alves Drive, Glenrothes, Fife would like to know whether anyone could tell him the pin connections of a GEC DataChat 1223 modem.

• **Digivision monitor** – Has anyone tried to use a Digivision monitor, model MC20-RGB/8-013? If so, do you know the input connections to be used? P A Sumner, Bolton.

• **Library virus?** – Mr Clive Payne thinks that his Archimedes has caught a virus. His hard disc space was eaten into when his library directory was duplicated 31 times i.e. a library directory inside the library directory, etc. He decided not to take any chances and took the drastic measure of

reformatting the drive. Let's hope that it was just a freak problem, otherwise it might seem that the vindictive 'virus' programmers have decided to turn their attentions to the Archimedes.

• **Hard drive test programs needed** – Has anyone got any hard drive test programs that I can run so that we can give some objective(?) comparison between the different drives?

• **Two minor irritations about First Word Plus.** Does anyone know the answers?

1. When printing, it always throws a full page at the end. I use continuous stationery (teletype rolls) for drafting and it makes me waste such a lot, to say nothing of the extra scissor work needed. How can one stop it from doing this?

2. It is annoying to be told that you must save a file before printing, even if you haven't made any changes. The system should really detect this.

Glyn Emery, London, N1. **A**

Comment

Charitable activities

As mentioned in the Products Available section, we now have Careware Discs 2 and 3 available. Fortunately, they were ready in time for the Acorn User Show so that we made £688 for charity just at the show. Add to that the £577 we had already received and that means we will be sending an initial donation of roughly £400 to each of (a) The Norwich Toy Library, (b) Children in Need and (c) The Evangelical Alliance Relief Fund. The first is a local charity which aims to help disabled children. It started by just providing a library of toys that they could borrow but now it has grown somewhat and they have a purpose built centre that provides all sorts of facilities for children and young people with special needs. The second is self explanatory, and the final one is an international relief agency which is run by Christians, i.e. it is not a missionary organisation, so you can be assured that the money is used for relief of suffering and not for propagating Christian belief.

What we are hoping to do for the Toy Library is to buy them a second hand Archimedes 310. We did think of getting them an A3000 but the A310, apart from being cheaper, is easier to use. Firstly, the disc drive, being at the front, is more accessible and secondly, by adding a keyboard extender cable, folk in wheelchairs can have the keyboard on their lap. Someone has provided a second hand 310 with dual drives and colour monitor plus RISC-OS and other software for £800, so please buy those new Careware discs so that they can make up the other £400 they need.

Second hand software

If you have any second hand software that you would be prepared to donate to charity, send it in and each month we'll put up a list of what is available and the approximate prices. Many thanks for all your help. **A**

The BBC Acorn User Show

Matthew Treagus

United by the sweltering heat and humid conditions, all those at the show enjoyed a very friendly get together – it was far too hot to get annoyed at anything. This was about the best show I have attended to date: the general presentation was much more professional than has been previously experienced. The exhibition was given a little more spice by a laser display projecting messages on to the surrounding walls and also live radio broadcasts from the BBC's Greater London Radio (GLR) stand. The new venue is superb and I am sure the show will be returning there next year. There was a lot more life in this show than in the Micro User shows of the past year which became stale due mainly to the lack of new and exciting products on display. Congratulations to the the organisers.

The A3000 launch

The newest addition to the Archimedes range – the A3000 – was officially launched at noon on the Friday, although the launch was not open to the public (which is just as well because the reports that have filtered back to me do not suggest it was the most gripping presentation in history!) (*Shame on you, Matthew! I thought it was quite... err... good. Ed.*). A reasonable number of machines were sold at the show under Acorns 0% credit scheme: the exact number sold has not yet been made known. (*Not likely to be!*)

A3000's played a prominent role at the show: companies were keen to demonstrate their add-on boards for the new beast. Most noticeable of these was Watford Electronic's 4M memory upgrade that looked to be very neat (a Mike Harrison creation I guess!). The A3000 also featured in an "Acorn Arcade" high-lighting Acorn's marketing plans for the new machine.

Acorn Stand

The Acorn stand was significantly large and well-staffed – a re-assuring sight for all Acorn owners. There must have been in excess of 40 staff on the stand ready to give help, information and advice on any subject from their "Acorn Clinic". Acorn and other software and hardware vendors were also

doing regular seminars on various aspects of Acorn computing. Well done Acorn!

Impressions

Impressions is the new DTP package from Computer Concepts which was on demonstration, although not on sale. The package is not being retailed as yet but must be worth waiting for before you consider a buying a DTP package. We can expect it to be around in a couple of months from now. BEEBUG are also writing a DTP package but I gather this is still a long way off yet – however check with them for release dates.

Memory expansion for A305/A310

Watford, CJE Micros, Computerware and Mach Technology have all announced their intention to make memory upgrade boards. Watford and CJE had boards on show – prices as yet are unfixed and it would be unfair to recommend a board without closer inspection and more data. My advice is to wait a while to see what happens. One thing that looks certain is that the boards will not be user-fittable and will have to be fitted by qualified dealers.

Mach Technology

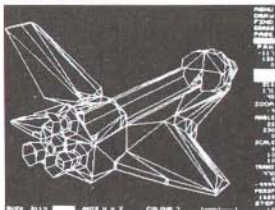
They did not turn up despite the fact they had a stand booked. Mach Technology have now moved to another address or at least are using another telephone number 0642 232235. As far as I know, nobody has been supplied with any Mach products – if you have received any goods from them phone the Archive office and let us know, but please do not contact us to tell us that you have not received a thing yet as we have wasted too much time already discussing this company. Positive news only please. My advice to any reader tempted to buy any of Mach Technology's products is certainly not to send in any money but to wait for more news. If you are already waiting for a product it would seem reasonable to me to ask for your money back, especially if you have been waiting more than four weeks.

(The phone number I was given was 0642-613143 and, a few weeks ago, Archive was taken to task for being 'negative' in its reports of Mach Technology, so if anyone has received anything from MT, please let us know so that I can be positive! Ed.)

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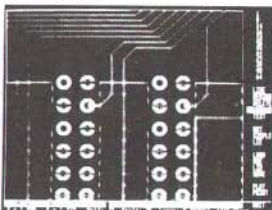
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ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001 resolution, 32 x 32 maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 300,000 components.

For hardcopy, the system supports the industry standard HP-GL, GRAPHTEC PLOTMATE plotters and printers at their highest resolutions. Also provides automatic drilling information with extensive support from PCB manufacturers for final layout and production, optional 1 year telephone Hotline support (£100) and software maintenance service (£75) is also available.

£195.00 (ARC)

Risc BASIC

The first true BASIC V syntax compiler which will convert your programs into supercharged Risc code for turbo performance leaving the competition standing. Features include Relocatable modules, full cross references, Double precision floating point & Integer support in-line assembly. Window-based or command line compilation environment, standalone code generator, object code optimiser, full array manipulation and dimensions support, multiple exit structures & full runtime error handler.

£99.95 (ARC)

RiscFORTH

A new 32-bit implementation of the FORTH 83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

£99.95 (ARC)

Good News

Morley Electronics are going to produce a teletext adaptor for the Archimedes that works properly, unlike the Solidisk one which still will not download software properly. Morley have promised me a review copy as soon as it is available which I guess will be a few months yet but as soon as I can write it, a review will appear in the magazine. I know a lot of you are waiting for a decent teletext adaptor.

Atomwide and the faster Archimedes

Atomwide are currently advertising the new MEMC1a, which is fitted as standard to the new machines, as a A300/400 series machine upgrade at £110 + VAT. They are also stocking the ARM3 board at £595 + VAT. (See the Hardware Corner, on page 28)

SCSI

Lingenuity are now producing SCSI podules for Archimedes machines at a price of £149+VAT for the 3000 and £199+VAT for the other machines. This will allow you to attach up to seven SCSI devices to one card. SCSI is industry standard and allows you to connect BIG hard discs (up to 512MB), tape streamers, CD Rom Systems, Laser Printers, Scanners and any other SCSI devices. Computerware also have plans for a SCSI podule.

Pipedream 3

It looks good and is implemented to take full advantage of RISC-OS. Check it out.

Worra???

A few new products from OAK. Worra CAD is a computer aided design package for only £50—it will output to a HPGL plotter or any device installed on the icon bar and will produce files in Acorn Draw format or DXF format for export to other packages. Worra Plotter is a useful little utility, although just a touch over-priced at £30: it allows a !Draw file to be plotted on an HPGL compatible printer. Also available is the Worra PCB (the function of which is obvious) also priced at £50. Contact OAK for more details. I will try to get some review copies—these look like good buys!!

Oops, nearly forgot—Worra Battle is not a bad 3D Battle game at £15.

Worra??? Any suggestions?

Brainsoft update

The Brainsoft Multi-I/O podule aroused a great deal of interest on the Archive stand. Sadly many had been put off by the devastating review it received in RISC User which to me seemed a bit over the top.

The podule has three ROM sockets, two RS232 ports, sound and video digitising plus four ADC channels all for just £130. This is a budget podule and potential buyers must not expect the quality of a more expensive product. The software, at the moment, lets it down. I do have a review podule in my machine but I am reluctant to review it until the new software arrives.

Other notable products

Acorn merchandise was on sale at the Coach House Promotions stand. The range included the exclusive Acorn lapel badges, disc wallets, carrying cases, sports bags, T-Shirts, sweat shirts, hats, mugs, dust covers, sew-on patches and teddy bears wearing cute little "I'm Archie" T-shirts, one of which I had to buy. (For my younger sister of course!!)

Spacetechn Weather Satellite Podule was very impressive and of great value to secondary schools, colleges and universities. Contact Spacetechn for more info.

Acorn have also promised an outline or bezier font designer. (These are the fonts used on the Acorn DTP package) No dates mentioned as yet.

The Datastore had their usual handful of useful goodies at very good prices. Data Store Disc 4 comes well recommended at £10.

The Serial Port were also demonstrating their bit-copier and archiver. This is software which takes a bit by bit copy of a disc and archives it for storage and back-up purposes. Since it copies bit by bit, it should even copy protected software. **A**

(There now seems little point in any software house even trying to copy protect its discs. All it does is annoy the genuine customer. Anyone who wants to copy illegally will not be deterred even slightly by their feeble attempts at copy protection. Ed.)

Dabhand User Update

Archimedes Basic Compiler Version 2 the Quality BASIC V Compiler
OS Guide · BASIC V Guide · Assembly Language Guide · Software Special Offers

▶ ▶ **Archimedes**
Basic
Compiler

Version 2 Now Available!

ABC is now being used commercially by software houses around the country to develop their own products. Repton 3 and Presenter 2 are just two examples of what can be done with ABC.

Here's what the computer press said about ABC version 1:

"...Excellent Dabs Press product. Buy it!" RISC User

"...I can tell you now, I am very impressed. This is a superb package." Archive

"ABC is a vital part of any programmer's toolbox, it puts compilers on other systems to shame. Unquestionably one of the most impressive pieces of software I have yet seen running on the Archimedes." A&B Computing

ABC2 offers even more including the following new features:

RETURN Parameters
Multiple exit PROCs/FNs etc
Double and Extended precision
fp with no loss of speed
Shared runtime libraries
Global TYPEing
Remove FP instructions
New version 2 manual
Technical support and backup

Local Error Handling
RISC OS Desktop compatible
(Installs on Icon bar)
Further extended CALL and USR
Automatic Register labelling
Optional Command Line operation
Improved HEAP and STACK directives
Extra Examples
Still no royalties to pay on compiled code

Coming Soon: Utilities disc with Profiler, Cross referencer and Library maker plus ABC65 the BBC 6502 code generator. Each supplied with comprehensive manual.

FREE DEMO DISC: To receive your free ABC demo disc which includes a cut-down version of ABC simply send us a sae and we'll do the rest! Benchmarks and specification on request. ABC1 users you should have now received version 2 automatically, free of charge.

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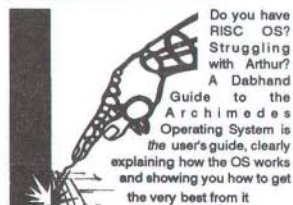
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The price of the 320 page guide is just £14.95 or £21.95 including the programs disc (with over 40 programs) and manual.

BASIC V: Dabhand Guide

For anybody interested in BBC BASIC then this book is essential reading. Assuming a familiarity with BBC BASIC the various many new components of BASIC V are fully described using example programs throughout.

An essential aid for all Archimedes owners, and including coverage of RISC OS BASIC. Price £9.95 - 128 pages - available now.



ARCHIMEDES ASSEMBLY LANGUAGE



This Dabhand Guide is a complete programming course in ARM machine code. For those new to assembler programming this book takes you step by step through the essentials. The inbuilt BASIC assembler, the machine code debugger and implementing BASIC equivalents in machine code are just some of the many areas covered.

Program in the Archimedes own language with this invaluable guide. Price £14.95 - 368 pages. £21.95 with program disc.

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BASIC Compiler Wars

Brian Cowan

My review of RiscBASIC has certainly stirred up some controversy! Last month's Archive carried a letter from an aggrieved Paul Fellows, the creator of the ABC compiler and my post bag included a letter from Dr Entwistle saying amongst other things: "...what a lot of nonsense Brian Cowan's table of tests comparing ABC with RiscBASIC is."

As I hoped I had made clear, my review was not intended as a comprehensive comparison of the two currently available compilers. I had reviewed ABC previously and my June article was intended primarily as a review of the newly released RiscBASIC. I am waiting for the appearance of Mach Technology's BASIC compiler before I attempt a fully comprehensive comparison. However, considering the waves that my review has created, I will give some extra comparative comments below. After that I will reply to the specific criticisms which have been made.

Fundamentally different products

It has become clear to me that ABC and RiscBASIC are extremely different products. The way that BBC BASIC has evolved makes it rather difficult to compile. That is not to say it is impossible to compile, but it can become rather clumsy. Many features of BBC BASIC are suited primarily to the interpretive environment, the most obvious example being the EVAL keyword.

ABC Philosophy

Paul Fellows produced ABC as his view of what a compiled BBC BASIC should be like. In other words, he approached the problem as a normal compiler writer might. He felt free to alter the specification of the language (which he himself had a hand in creating!) to make it like a compiler-type language where necessary. The Silicon Vision project was viewed entirely differently. They took the BBC BASIC V specification and endeavoured to produce a compiled version in its entirety. Certain features of the product may end up being rather cumbersome (a table of all BASIC keywords would be needed for EVAL), but full compatibility

with the interpreter is the ideal. This aim has not been completely achieved, but that is their essential philosophy.

It is therefore unfair to take existing BASIC programs and expect them to compile with ABC. You may be lucky, but in general you must write your programs as you would for a compiler. This means that you must study the ABC manual and remember, for example, that you no longer have dynamic variable scoping – compiled languages do not have this even though interpreted BASIC does. The payoff for this investment is that you should produce efficient and well-structured compiled code. The claim is that, as programs become more and more complex, if they are written to run under ABC, the ABC code will run faster than RiscBASIC code. I will include tests in a future comparison. Fundamentally, ABC does not claim to "emulate" the BASIC interpreter.

RiscBASIC philosophy

Using RiscBASIC is an entirely different matter. Their philosophy is to be fully compatible with BASIC V syntax. Therefore, any program which runs under the interpreter should compile immediately (so long as it does not use unsupported keywords) and RiscBASIC must be judged according to this strict criterion. In this respect I should perhaps say that some of my programs did not run on early versions of RiscBASIC: there were bugs in the compiler. I did not deem it necessary to report these in my review since they were all corrected in as they were reported to Silicon Vision. However, it may be relevant to point out that I found no bugs in either version one or version two of ABC.

Further comments

I have neither the time nor the space at present to compare further and in depth the question of producing relocatable modules nor the different approaches to assembler support adopted by the two compilers. They are different, each claiming to have its advantages. But I must include some remarks about floating point precision. ABC (version two) provides the full range of single-,

double- and extended-precision floating point support and you can specify the precision required for each variable. In RiscBASIC there is no extended precision. There is a single precision compiler directive which means that you choose either single or double precision for all variables. This can be awkward because sometimes you might wish to store intermediate results of a calculation at a higher accuracy.

Yours, 'Disgusted of Norwich'

Now let me turn to the specific points made in Paul Fellows' complaint last month and the letter from Dr Entwistle.

Paul Fellows makes three points: I will answer them in turn. Firstly he states that no mention is made of the fact that ABC (v2) can be installed on the icon-bar of the RISC-OS desktop with full file-dragging operation. I saw no need to discuss this since the version of RiscBASIC that I was using could also be installed on the icon-bar in the same way. Both compilers are thus fully RISC-OS compatible, as one would expect: I would complain vociferously if a newly produced application was not RISC-OS compatible.

The second point concerns the use of compiler directives. The complaint is that I have not compared like with like, having not used all directives in both cases. However, I don't think it is fair to compare ABC's NOESCAPECHECK and NOSTACKCHECK directives with the TURBO directive of RiscBASIC – they are entirely different. The TURBO option is applicable to correctly structured programs, rather similar to the way programs had to be written to run under ABC version one. It is true that ABC version two has relaxed this restriction, but there is no directive comparable with RiscBASIC's TURBO. The use of NOESCAPECHECK is an entirely different matter.

Thirdly I am criticised for concluding that RiscBASIC is faster than ABC solely on the basis of benchmark tests. This is simply not so. My conclusions were based on a variety of tests. The review included a discussion of calculations for the digits of π (to some peoples evident disgust!), and I devoted a paragraph to the discussion of calcul-

ating fast Fourier transforms. All the programs I tried which successfully compiled ran faster under RiscBASIC. However I have recently been looking at string sorts and these do go faster with ABC. Sorting 200 strings of six characters took 6.8 seconds under the interpreter, 8.7 seconds with RiscBASIC and an amazing 1.0 seconds under ABC. It may be, as mentioned above, that larger and more complex programs also run faster under ABC. I will report on this in the future.

Turning now to Ian Entwistle's complaints, these refer mainly to the timings I quoted for the benchmark tests and the fact that his timings seem somewhat faster than mine. I think this is because we are both quoting very short times. In such cases, the actual execution of the program calculations may not take the bulk of the running time; things like the screen mode become important and there is also a problem in timing fast events, related to the way that the Archimedes clock operates. TIME is incremented by one, every hundredth of a second, which could result in an error of up to two centiseconds.

Interestingly, Dr Entwistle gives some comparative timings for Mandelbrot Set calculations. I quote: "BASIC V 53.91 mins, ABC single precision 50.78 mins, ABC double precision 57.19 mins, ABC extended precision 58.05 mins." Unfortunately there are no figures for RiscBASIC and I do not have the program to run the tests myself. He makes the point that Mandelbrot calculations might be a more realistic test for compilers. That is presumably because that is what he is using his machine for. Similarly, I thought fast Fourier transforms were a good idea.

Conclusion

My conclusion stands then. If it is compatibility with interpreted BASIC V that you are after then RiscBASIC is the clear winner. On the other hand, if you need the benefits of a compiled language but feel that the effort of learning a new one such as C is too daunting, then ABC is for you. It will be necessary to become familiar with a few new rules but it will also provide a gentle introduction to the world of compiled languages. **A**

First Word Plus Column

Mike Hobart

For family and work reasons, I find that I am not coping with writing this column and replying to queries as I should, so I have decided that this will be my last. (*Any offers for another FWP editor? No pay, just blood, sweat, toil and tears! Ed.*)

I write it a little over a year since the Archimedes version of First Word Plus was released and on the eve of the BBC Acorn User exhibition, at which I hope to see quite a flood of new software, including Pipedream 3, and several DTP packages including Impression, which is claimed to be a word processor as well. I have also, after quite an effort, "moled" my way into the Acorn fastness and talked to the First Word Plus authority. I sent him a compiled grouse-list, mine and yours, and I quote his initial paragraphs:

"First Word Plus is based on a product which has been available for many years now and, in its day, was state-of-the-art. Today it is overshadowed by word processors that verge on the functionality of a Desktop Publishing package (and cost proportionately more). The Archimedes version is little more than a port of the GEM version and is therefore very much tied to internal data structures and techniques originally used, and which are now rather dated and difficult to alter. This does not cause a problem whilst First Word Plus is performing as it was designed to, but makes it difficult to make changes or extensions for which it was never intended.

The reason I outline these difficulties is that many of my answers to your subscribers queries are of the form 'Sorry, you can't do that in First Word Plus, and we have no plans to alter it so as to allow such functionality'. This is not to say we do not listen to customer feedback, in fact to the contrary, but First Word Plus would likely need a total rewrite to implement such features. We are, of course, always re-assessing the market requirements for word processing, and if we decide to release a totally new word processor, we will take any customer feedback into consideration."

As I read between the lines, there may be a minor revamp, but we are really not going to see an all-singing First Word Plus. We must accept it as it is, with strengths and weaknesses, and if we need something a bit more professional, pay up when we find it. We may see a "heavy" wordprocessor from Acorn in due course.

Other points which my contact makes in his letter, which do not fall into the 'Sorry...' category are:

Acknowledged bugs:

The operation of Swap Headings is reversed. This will be fixed in any new release.

The scroll bar within the file dialogue does tend to misbehave at times.

Acknowledged 'features':

It is not possible to have automatic reformatting.

Footers cannot be suppressed on individual pages.

GEM (the original OS for which First Word Plus was written) has made a negative contribution to window handling, especially access to underlying windows.

Importing ASCII does cause problems. This is due to the way end of line and end of paragraphs are treated. An end of line is defined as a space and a carriage return, whereas an end of paragraph is just a CR. The trick is to insert a space at the end of each line which is not the end of paragraph. A program could be written to replace all CR with <space>CR, unless the CR is immediately followed by another CR (usually a good way of determining the end of a paragraph). Now enter First Word Plus, select wp mode and search and replace the entire document with a space for a space (sounds silly, but it is to do with First Word Plus internal format).

The spelling checker cannot be automatically loaded and therefore engaged.

So, we shall see what Acorn comes up with next.

Finally, many thanks to all long-suffering readers, writers and editors! Bye for now. **A**

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Archive Bulletin Board Service

Richard Forster

(The King is dead, long live the King!)

Recently Eureka II has gone through some major changes, not least, a name change. Its new name of 'Archive BBS' may not be as immediately fetching as the old name, but it does indicate the link with the magazine. If you have not called within the last couple of months you will hardly recognise the board. A myriad of alterations have happened to improve appearance and to reduce time spent online.

The board is currently very popular and it is still hard to get onto, especially in the evening. It is also growing nicely – the number of users is approaching 500. In order to accommodate the variety of users interests, more message areas have been opened up. One of particular interest is an area where Philip Colmer of Acorn answers problems.

As promised for a long time, more lines are currently being installed. Three new System X lines were installed on July 24. Two form an automatic group, sharing the same number. The other is a single line. The board will move onto the new single line sometime in the future (with a modem answering the present line to advise people of the new number). BT have been very helpful both with the time-scale for the installation and the provision of facilities. Not only did Alan get the numbers he specifically requested but, having explained the intended use of the lines, had no arguments about having the new lines at residential rate either!

User List

This feature from the main menu has been vastly improved. Until recently, all it could do was list everybody in order of user number. It has just been adapted so you can enter a search string. This will scan through the user file, printing matching entries – this makes it quite powerful. You can still get a full printout by just pressing <return> instead of entering a search string.

The matching is not just name specific – you can search in all of the fields. You can basically search as either part of the first name, part of the surname, from both names or part of the town. A final option

is provided for searching through the user number. These facilities are very useful if, for example, you want to know who else is calling from your area, or if you want to find someone whose name you're not quite sure how to spell.

ARCed message facilities

The most powerful of the recent changes must be the ARCed message file facilities. This allows you firstly to download all your private mail and all the new sig messages in a compacted file, and then to upload messages in another compacted file. The benefits of this are obvious and it is very easy to use.

To download all the new mail you simply type "<" at the main menu. The BB will search through the messages (taking a few seconds). Once it has done this, it will compact it into a file which you then download as normal using Xmodem. Uploading is just as easy, simply typing in ">" and then uploading the file.

The message headers used on download have been designed so that they can be re-used without any alteration for upload. The format of the header is:

```
[[ SenderName <ReceiverName  
  \Title ~SigNumber @PriValue ]]
```

Most of these fields have a default value on upload, so the minimum use would be :

```
[[ SenderName ]]
```

(This would send an untitled private mail message back to SenderName)

Fields can be entered in any order (because they are prefixed by a unique symbol) except for SenderName which must come first.

There are a couple of restrictions to watch for:

```
[[ - may not appear in the text at all  
< \ ~ @ ] - may not appear in the header other  
  than preceding the fields mentioned above.
```

To make life easier, the uploaded text is changed in the following ways :

The routine which decodes the uploaded text has a number of features to make life simpler.

Automatic word wrap at 70 characters

Accepts CR or LF as a line terminator (without giving 2 lines for CRLF)

A blank line does not terminate a message (only End of File or [] will do so)

A message over 99 lines will be continued in another message

Filters characters (apart from LF and CR) outside 32-126

All these taken together should allow any text editor/word processor to be used for generating messages with very little difficulty (and much less hassle than attempting to spool files on line!)

Finally...

The new features, while initially looking daunting, are very easy to master and allow for much smaller online times. This in turn helps other users to get on, and keeps your phone bill down. It is worth using the ARC message feature, if not for uploads, at least for downloading messages as it really does save a great amount of time. The board has been noticeably clearer now that users are beginning to

use the various speed-up facilities introduced over the past couple of months.

Archive BBS (Previously Eureka II) is available on (01) 683-0629 24 Hrs a day, 7 Days a Week, 53 Weeks a year, 8N1, TTY. V21, V22 (bis), V23, Reverse V23

This month's registration word is SIXPENCE. To register yourself as an Archive member (which you only need to do once) type 'R' at the main menu and enter the word. Do not confuse this with the password which you choose when first joining the system ... the password is your guarantee that no-one else gets onto the system in your name, so you should choose something appropriate, memorable and secret!

Archive BBS Hints & Tips

In the Hints and Tips section on page6 we have put a sample of the hints and tips being shared at the moment on the bulletin board. It should give you a flavour of what you are missing. **A**

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Hardware Column

Brian Cowan

This month I am looking at all sorts of different things under the general heading of "Hardware". First, I have a few comments to make about the new A410/1, including how to do the ram and disc upgrades, then there is a bit about the new ARM3 processor which multiplies the speed of the ARM by another factor and finally I look, more speculatively, at the forthcoming PC podule from Mach Technology.

The New Archimedes 410/1

We have been planning in my laboratory for some time to buy some more Archimedes computers. We dismissed the possibility of purchasing some of the new A3000 machines since they could not accommodate an internal Winchester, while also feeling that we did not particularly want any more of the old-style 440s as any new Winchester drives really need to have 60 Mbyte capacity. It seemed that the new 400 range was just the thing but currently only the 410/1 machine is available. This has one Mbyte of RAM installed, expandable to four Mbytes, and no Winchester included, but the control circuitry is all present. This could be customised to our requirements so I decided to try one out.

Documentation

On unpacking the large box containing the computer, the first thing I discovered was three books. There is the expected slim Welcome Guide but there are also two fat volumes: a User Guide (as included in the RISC-OS upgrade kit) and a new BBC BASIC Guide. I was not sure whether the new machines would include the BASIC Guide so I was pleased that it was there. All the books say on their covers that they are for the 400 range machines, but inside there were lots of references and even pictures of the old 300 series machines. I found quite a few errors. In particular, the description of the screen modes is quite confusing and certainly contradictory from one book to another. However there is much more information than in the old User Guides. The mind boggles at the prospect of the new Programmer's Reference Manual which is rumoured to run to four volumes!

Appearance

Externally the 410 machine looks very similar to the older 440 machines. The main thing you notice is that the floppy disc drive is of a different design. The drive facia is integral with the drive unit so the Archimedes front panel is cut away for this. I think this is a much better arrangement as it means there can no longer be problems due to bad alignment between the disc drive and the Archimedes case. The rear of the machine has the same connectors as the 440 including the two BNC sockets for the high resolution monochrome output.

Inside

Removing the cover, the inside looks quite similar to the old models. There is a four-slot backplane installed, but this is the newer design containing two PAL chips for the Interrupt Priority masking as well as the original Podule select decoder chip. There is a cooling fan fitted in the usual place. Most of the printed circuit board looks similar to the older models, the ARM family chips being in similar places. There is no sign of surface mounted devices as in the A3000 machines. It is also interesting that the new machines still have the two Duracell primary cells to power the CMOS RAM/clock chip rather than the trickle charged NiCads introduced in the A3000. There is the single loudspeaker (the A3000 has two) mounted in the usual place on the front facia. Although it is the same size as on previous models it now has a much more substantial magnet so it should be capable of "better" sound

Floppy disc drives

Functionally, the new-style floppy disc drives (also used on the A3000) are not as good as the older ones. The ribbon cable joining the drive to the Archimedes printed circuit board has two lines cut because the drives do not support the "disc changed" and "eject" lines. (As Mike Harrison explained last month). This means that floppy access can be slower since the ADFS must check the disc every time, especially if the machine is configured NoDir. On the older drives, configured NoDir, the first time you access the disc the catalogue etc is read. Subsequent accesses check

the “changed” line and don’t read the catalogue information if the disc has not been changed. On the new machines the disc is always accessed and therefore the state of the Dir/NoDir configuration will make a much more significant difference than on the old drives.

RAM chips

The RAM chips are positioned under the “bridge” upon which the disc drive(s) sit. Although this follows the layout of the older models, it is rather inaccessible and I would have welcomed a repositioning of the RAM. The bridge is pop-riveted onto the case (unlike some of the early 300 series machines) so that the entire PCB must be removed to perform memory upgrades. On those 300 machines where the bridge was screwed on it was possible to install the RAM upgrade (from half to one Mbyte) by removing the bridge and leaving the circuit board in place. However, it turns out that there are other good reasons why the PCB should be removed for RAM upgrades as explained below.

I had a three megabyte set of RAM chips ready as I wanted to upgrade to four megabytes immediately. Each megabyte consists of eight 256K by four bit SIM chips. These are mounted vertically and have a single line of pins which are staggered alternately, giving two rows of legs spaced one tenth of an inch apart. They can be quite delicate so take care!

Expanding the RAM

Installation of RAM upgrades necessitates removal of the printed circuit board. First make sure that your machine is unplugged from the mains and remove the keyboard and any other plugs. Having removed the cover from the machine the first thing to do is to undo the two screws which secure the backplane bracket. The backplane can then be unplugged and placed upon the PSU casing.

There are four “Lucar” connectors from the power supply unit attached to the board. Note which connector goes where (there are two five volt connections, one plus and one minus, i.e. one red and one purple!). Remove these connectors from the board and the three other plugs in the vicinity. The other plugs are all different and so cannot be confused.

Removing the board

There is an earth strap secured at the right hand side

of the floppy disc drive. The nut must be unscrewed and the lead removed from the stud. Prior to removing the circuit board it is advisable to remove the two podule blanking plates from the back of the computer. This will facilitate easy removal of the board. Then undo the two screws fixing the lowest back plate, the one attached to the PCB. There are two guides, one on each side of the board. These guides are fixed to the case and the board must be slid through them. As you remove the board be sure to lift it up slightly so that nothing scrapes on the underside damaging circuit tracks. Once the board is fully removed, there is a spacing post in the middle of the board. This must be removed so that the board can be placed on a flat surface.

Fitting the chips

To install the RAM chips it is vital that the circuit board is placed on a firm and flat surface – some force is needed to insert the chips and the circuit board must not be strained. If you are upgrading from one megabyte to two then eight RAM chips must be installed into the sockets between the eight existing soldered-in chips. The chips must be inserted the right way round – facing the same way as the installed ones, i.e. the chamfoured corner towards the front of the computer. Take great care in pushing the chips into the sockets. It is better to start the insertion from one end, but do not twist the chips too much. Following insertion of the chips move link 14 from position B to position A. If you are upgrading to the maximum four megabytes then all 24 sockets must be filled and both links 14 and 15 must be moved from position B to position A. Once the RAM chips are installed, the circuit board can be replaced, but please note that if you are going to install a Winchester (see below) then there are some other things you might wish to do while the board is out of the machine.

Reassembly

Replacing the circuit board is quite straightforward. Insert the spacing post in the hole in the middle of the board and then slide the board through the two support slots into the case. You may need to stick your fingers over the metal “bridge” to slightly lift the board so that it can locate in the slots in the front moulding. Once the board is fully home the two screws securing the backplate can be inserted. Next

replace the earth strap and replace the three multi-way sockets and the four power connectors. The machine can then be turned on and tested. Assuming that everything is OK, you can check on the available RAM by inspecting the Task Manager or by looking at the information preceding the BASIC prompt.

Hard disc installation

(See also Mark Taylor's article in Archive 2.9 p 42.) I wanted to install a Winchester in the new machine, and I had decided that twenty megabyte capacity was sufficient for this machine. I hope to fix sixty megabyte drives in some older machines, and so I "borrowed" a 20M Acorn drive from one of those 300 series machines. There are holes in the metal bridge of the new machine for screws to fix the Winchester. Unfortunately these holes were not threaded. One could either use self-tapping screws or the holes could be tapped. I was unhappy about using self-tapping screws in such a confined area — you have to use some force and support the screws as they go in. As the circuit board was removed from the case I threaded the holes with an M3 tap. It is not advisable to tap the holes with the board present as the swarf could cause serious damage by creating short circuits. Even with the board out, after tapping the holes make sure all swarf is removed. I placed a sheet of paper under the bridge while tapping to aid this. *(I have upgraded several machines for subscribers and I find that the self-tapping screws are easy enough to fit. Ed.)*

Connecting cables

With the PCB all reassembled, the Winchester drive can be screwed down. The hard disc access light is already installed in the front panel behind the Archimedes sticker and below the power light. Incidentally, on these new machines the lights are in a marginally different position, being moved up slightly. It looks as if there is space below for a third light if required. The power lead to the Winchester plugs in simply, and it then only remains to take care of the two hard disc ribbon cables. The Acorn Winchester Podule leads are quite OK although somewhat longer than needed. I used these to get started, while I ordered the connectors to make new ones and liberate the podule leads.

There is a 20-way and a 34-way lead to be made from standard ribbon cable. (These cables are provided with disc upgrade kits from Computerware etc.) You can use a length of 34-way cable and cut it down for the 20-way one. Each finished cable needs to be only about two or three inches long. The connectors for both ends of the cables are standard RS Components' items. The 20-way and 34-way connectors for the Winchester are part numbers 471-266 and 471-288 and those for the circuit board are 474-300 and 474-322. The Winchester connectors recommended by Mark Taylor have mounting flanges and are therefore not suitable for many drives. It is a fairly easy matter to assemble the leads by gently squeezing the connectors onto the cable, for example using a vice.

Reformatting

I was pleased to find that the Winchester worked perfectly once the machine was correctly *CONFIGURED for one hard disc. I was able to read all the old files and there were no problems. The Winchester access light was quite visible through the sticker even without the small clear window. Out of interest, I decided to reformat the hard disc with the new E standard. The Support Disc which comes with the machine contains the latest hard disc formatter. I carefully backed-up my old files that I required and ran the formatter. This was quite straight forward as it answered all its questions automatically, and following formatting I left the system on soak test for a few hours.

The ARM3 Processor

Bigger and better

The evolution of microprocessors in a given family usually follows a logical process of development. This is evident, for example, in the Intel 80x86 family; the instruction set for each later member of the family is a superset of the instructions of its ancestors. In this way, upward compatibility is assured and software can have a long life. However each new generation starts afresh, with a new circuit diagram. Unfortunately there can be problems with such an approach. Things may not work quite as they were planned: upward compatibility may not be fully complete (as in the unfortunate 80186), and planned advances may not actually be realised (as in

the 80286). In certain respects, each generation starts from scratch, with all the problems that can entail.

But still RISC...

Acorn have adopted a completely different approach. Since they are committed to the RISC philosophy it is clear that the next generation ARM is not going to have masses of extra instructions. So apart from making the thing go faster (and here the main problem is with the RAM), what else can they do? Readers of my column will know one of my wishes: implement floating point instructions – but presumably the riposte is that there is more to life than number crunching!

RAM cache

To increase processor throughput speed is the most important aim and simulations have shown that you do not need a huge amount of super-fast RAM to obtain a significant improvement. Acorn's answer is to provide the CPU with some fast RAM on the chip – a RAM cache. The ARM3 chip that Acorn are presently in the process of producing contains an ARM2 CPU together with 4 Kbytes of RAM. Transactions between CPU and cache can run at a clock speed of 25 MHz instead of the 8MHz of the present ARM2 machines. So the more RAM accesses there are to the cache rather than to the external RAM, the greater the effective speed increase.

Coprocessors

There is a small problem, however, with this scheme. The CPU data bus connects directly to that of the RAM cache. The external data bus is the "other side" of the cache: the CPU communicates with the outside world only if it cannot find what it wants in the cache. However, coprocessor operations cannot proceed in this way – they should not pass through the cache, but go to the CPU directly. For this reason, the ARM3 must provide a coprocessor data bus as well, an extra 32 pins! The unfortunate result of this is that the existing(?) coprocessor podules can not be used in an ARM3-upgraded Archimedes since they connect directly to the system data bus.

ARM3 upgrades

So can you do an ARM3 upgrade? Yes. A company called Aleph One will be producing an ARM3

upgrade board for existing Archimedes machines for £595 + VAT. (*The first batch of chips arriving mid August all have deposits on them but they are hoping for a second batch at the end of August! Ed.*) This should give an average speed increase of some two to three times and up to a possible five times. Code that is specially written to take advantage of the cache structure will show the greatest increase and I understand that both RISC-OS and RISC-iX (the UNIX kernel) have been written in precisely this way.

Whither FPU?

This leaves a cloud hanging over the floating point coprocessor. Is this the reason why Acorn have been dragging their feet over this project? Consider the facts. The FPU podule will cost over £700 and it will give a speed increase of perhaps three times for floating point operations only (no speed increase for interpreted BASIC V). On the other hand the ARM3 upgrade, costing probably one hundred pounds less, can give a comparable speed increase for all operations. What is more, the FPU podule is incompatible with the ARM3 upgrade. Having waited eagerly for the FPU podule since the arrival of my first 440, I am now not so sure I shall be purchasing one.

Best of both worlds

For the real speed merchants, the ideal would be to have an ARM3 upgrade board which included a floating point coprocessor. Aleph One are thinking about that one! If you would like to find out more about the ARM3 chip and its development, there is a good article in the May and June issues of Electronic Product Design and to hear the Acorn point of view you should read the article by Roger Wilson in the July/August issue of Risc User.

(Much useful information for this section was provided by Alex van Someren of Aleph One, and Mike Harrison – many thanks to them.)

PC podule

In last month's Archive there was a note about a PC podule being produced by Mach Technology. From time to time, in the Hardware column, I have mentioned that this was a highly desirable add-on: serious MS-DOS users will almost certainly

become frustrated at the poor speed performance of Acorn's PC emulator. I have not seen Mach's product yet but from conversations with their engineers it sounds most impressive.

Second processor

The system is implemented fundamentally as a "second processor" very much along the lines of those units which connected to the "tube" of the old BBC computers. Thus the role of the Archimedes is simply to handle the input/output side of things: the keyboard, screen, disc access, etc.

The hardware

The podule contains an 80286 processor running at 12MHz with 640 kbytes of RAM. This is, therefore, an imitation of an IBM PC-AT machine, with a real 16 bit data bus. A version 4.xx of MS-DOS will be supplied and reasonable documentation is promised, unlike that with the Acorn Emulator! An on-board socket will be provided for the 80287 floating point coprocessor, and a single AT-style expansion slot will be available at the back panel of the podule.

Graphics

Graphics support is an interesting question since, as this is part of the I/O functions, it is handled by the Archimedes. In principle (monitor permitting) any graphics standard can be implemented; it is a question of software. Currently CGA and VAA are running and it is planned to produce VGA as well. However, since all screen handling is essentially software emulation, there could be speed limitation problems.

Mouse and windows

A mouse driver will be provided to make the Archimedes mouse appear as a PC mouse, but the PC mouse uses only two buttons. It is planned that the third mouse button will provide access to RISC-OS from within the PC environment, another thing that you cannot do with the Acorn Emulator. This access to RISC-OS should be quite powerful. It will be possible to run MS-DOS in a RISC-OS window while running other Archimedes functions in other windows.

Floppy discs

The podule will not, however, contain a PC-style disc controller chip. Instead, the unit will poke the

Archimedes 1662 disc chip directly. So certain highly protected PC software will still not run, and of course the higher capacity 1.2 and 1.4 meg floppy disc capacities will not be supported. Standard 5.25" drives can be used in the usual way with one of the many external drive interfaces available. It should be possible, however, to build a disc drive interface using the PC disc controller chip connected to the AT bus. This would overcome the protection problem and allow the higher capacity discs to be used.

Winchester partition

Hard disc storage will similarly be controlled by the Archimedes. The MS-DOS partition on a Winchester will be implemented as a single large ADFS file as with the Acorn Emulator. I have not ascertained whether this will be compatible with/identical to the format used by the Acorn Emulator. Hopefully it will be, although of course the Acorn PC partition will contain MS-DOS version 3.21 which will have to be disabled.

Conclusion

All in all, this looks to be an exciting product. For what you should get, the price of £299 plus VAT seems quite reasonable. I have placed my order for one and I will tell you all about it as and when it arrives. **A**

Contact Box

- **Bristol Area User Group** – for details, contact Mrs J Dollin, 13 Mountbatten Close, North Yate, Bristol, BS17 5TD. (0454) 323081.
- **Euclid User Group** – For anyone using Euclid who is wanting help and mutual support, there is now a user group run by Richard Molyneux, 42 Keswick Road, Great Bookham, Leatherhead, Surrey, KT23 4BH. (Or contact Ace Computing on 0223-322559.) **A**

Ah, a spare square inch! Just space to tell you that the articles that would not fit in this month's edition are: reviews of Clabel, I-APL, Premier and Eucorn. (The latter is Matthew Treagus' programmer's view and we could do with a musician's view. Any offers?)

MS-DOS Column

John Eden

Well here it is, finally, after an absence of six months, the MS-DOS Column has returned to the pages of Archive magazine. I am sure that you would all like to join with me in thanking Ken Biddle for the sterling service he has given in producing this column over the past months. Please keep sending in your letters, ideas and suggestions for the column, or any hints and tips you may have on using MS-DOS or the emulator.

RISC-OS and the emulator

If, like me, you rushed around and converted your PC Emulator disc to operate under the RISC-OS desk top, you were probably as surprised as I was to discover that the memory available to DOS was some 60k less than under Arthur. (Machines with more than 1M excepted). I haven't quite worked out where it all goes yet but some is taken by ADFS buffers and I think some goes in the user sprite area too. Indeed, the more applications you start, the more sprites that are added to the sprite area, the less memory you have when you start up the emulator.

There is a new version of !PC available which takes account of this problem and also allows users of 4Mb machines to kill off various modules as well. If you have access to a modem and can get on to the Archive BBS, you will find this version of !PC in the download area. Alternatively, if you send me a blank formatted disc (ADFS) and stamped, self addressed Jiffy bag, I will copy it for you. (A size MM000 bag and one 3.5 inch disc will travel around the country quite happily for 14 pence!)

The new version of !PC takes no account of ADFS buffers when optimising memory so it is still necessary to *configure adfs buffers to 0 if you want to free the maximum amount of memory for DOS.

In the mean time, for those of you who cannot obtain this and who need as much memory as possible, you should make the following changes to the PC program in directory PC of your working copy of the emulator disc.

LOAD the PC program into the BASIC editor, locate line 350 and insert the following lines after it, each on a separate line.

```
IFn$="Desktop" =TRUE
IFn$="Filecore%RAM" =TRUE
IFn$="BBCEconet" =TRUE
IFn$="InternationalKeyboard" =TRUE
IFn$="SpriteExtend" =TRUE
IFn$="Draw" =TRUE
IFn$="TaskManager" =TRUE
IFn$="PaletteUtil" =TRUE
IFn$="Filer" =TRUE
IFn$="ADFSFiler" =TRUE
IFn$="RAMFSFiler" =TRUE
IFn$="NETFiler" =TRUE
IFn$="ShellCLI" =TRUE
IFn$="Hourglass" =TRUE
IFn$="NetStatus" =TRUE
IFn$="RamFS" =TRUE
```

You may if you wish renumber the program to tidy it up. Finally SAVE the PC program back to disc.

To allocate the greatest amount of RAM, two *configure commands are required.

*CON.SPR.0 (sets system sprite space to 0)

*CON.ADFS.0 (sets ADFS Buffer space to 0)

To run the emulator: type PC.PC from the supervisor prompt. If you now do a chkdsk command, DOS should report 600k total memory. (Hard disc users may have a little less.) This leaves about 540k available for applications. You will not be able to start the emulator from the desk top by clicking on the PC program, but I do not think this should pose any great difficulties.

Connecting a serial printer

In last month's Help Column (2.10 p 28) Chris Walker wanted to know why the PC emulator uses the parallel printer port even when the machine is configured for a serial printer.

The reason for this is quite simple. Although you may have configured your Archimedes for operation with a serial printer, when you start the PC emulator it does its level best to pretend to be a PC. As far as a PC or any of its compatibles is concerned, the default printer type is parallel unless you tell it otherwise.

If you want to use a serial printer under MS-DOS you must redirect the printer output to the serial comms port. This process requires two mode commands which should be put in your config.sys file if you want this as default. The first mode command is used to set up the comms port to the correct baud rate and parity for your printer. The form of the command is:-

```
mode com1: baud,parity,data,stop,p
```

Baud rate can be any of the standard speeds from 110 to 9600 and can be abbreviated to the first two digits. Parity can be odd, even or none. Data bits 7 or 8 and Stop bits 1 or 2. P should be included if you are setting up the comms port for use with a printer. If you omit P and try sending data to a printer which is busy, the computer will give up after a short while which could lead to unpredictable results.

For example, to set up comms port 1 to 9600 baud, no parity, 8 data bits and one stop bit with continuous retries (if the printer is not ready) you would type:-

```
mode com1: 96,n,8,1,p
```

The second mode command tells DOS to redirect its printer output to the serial communications port and has the form:-

```
mode printer=port
```

where printer can be any of the three standard parallel ports lpt1 to lpt3 and port can be com1 or com2. Since the Archimedes only has one parallel and one serial port only lpt1 and com1 are valid, so to redirect output from the parallel port to the serial port type:-

```
mode lpt1:=com1:
```

To cancel redirection and restore printing to the parallel port type:-

```
mode lpt1:
```

Serial bugs fixed under RISC-OS

While we are talking about serial devices, I am sure you will be pleased to know that the serial port now works fine if you are running the emulator under RISC-OS. You can even successfully use the port with a modem. Make sure you strap together pins 1, 4 and 8 at the Archimedes end and use pin 6 (DSR) as a substitute CTS line.

An associated problem which may have afflicted some of you is Unknown IRQ error at &00000000. This problem occurs on some machines when electrical noise is picked up on the serial cable. In my case, almost anything electrical in the house would cause the machine to crash. Unlike native Archimedes mode, the emulator does not give an error message but just hangs. This problem has also been eradicated with RISC-OS and even under the severest provocation I could not make my machine crash in either native or PC mode.

Contact

If you have written in to the column over the past couple of months and have not yet received a reply please bear with us. As soon as I manage to get things organised everything should run more smoothly. You can write to me either care of Archive, or direct to John Eden, 13 Cranleigh Gardens, Luton, Beds. LU3 1LS (no phone calls please!). Or if you prefer you can leave me a message on the Archive BBS, account 28. **A**

TABLER – The Magical Memory Manager

Keeping track of tables, ARM code or data blocks, often causes a lot of time wasting hassle. Tabler stops problems of fragmentation, redimensioning, finding unused memory and having code & data scattered around memory and in different disc files. All tables are created using a few simple parameters. Tabler builds the tables so they, and the Tabler, can easily be saved in a single block.

An invaluable utility for any kind of programming, Tabler can be used from BASIC or ARM and is especially useful for high speed arcade game tables.

Tabler handles up to 63 named tables and 6 different table types:- 2D, Counted 2D, Sorted 2D, Workspace areas, ARM libraries and variable length table entries (such as sprites). Executed with a library holding procedures and ARM macros.

17 command; Tables can be Created, Copied, Deleted, Named, Equired upon, Listed, Displayed or Redimensioned (no data loss)

Entries can be Added, Inserted, Executed, Replaced, Equired upon or Altered

Price: £9.50 for the full version & manual

£2 for the demo version & manual (£8.50 to upgrade)

ZOD THAT SOFTWARE

25 St. Patrick Sq., (TRF), Edinburgh EH8 9EY.

GraphBox – Pictures from Numbers

Gerald Fitton

With Minerva's GraphBox you will be able to print graphs and charts from sets of statistical data. GraphBox will run only under RISC-OS (i.e. NOT Arthur 1.20) but in return it lets you take full advantage of all the other RISC-OS applications such as !Draw and !PrinterDM which you have now as well as the ones that you might get in the future (such as applications from Acorn's DTP package).

I am only now getting used to the idea of transferring ASCII text into !Draw so I am a little overwhelmed by the potential of such applications as !GraphBox which allows pictures to be created and then transferred into !Draw. However, I am impressed enough to realise that adding separate RISC-OS multi-tasking applications (such as GraphBox) is the way I want to develop my system and I am pleased at the way in which Minerva have integrated this application with !Edit, !Draw and !PrinterDM. Now that Acorn's DTP application package is available, GraphBox files will integrate with all the new applications therein (see below) to the enhancement of the total system.

What do you get?

The disc contains two RISC-OS applications, !GraphEdit and !GraphBox, together with a directory of fifteen examples and a 36 page booklet.

!GraphEdit

!GraphEdit is an easy-to-use RISC-OS application for entering labels and numbers in a form suitable for exporting into !GraphBox. Using it is as simple as entering data into the boxes of a spreadsheet. You can change the order of the columns of figures, delete existing columns, create new blank columns and duplicate a column. However, !GraphEdit does not pretend to be a spreadsheet so you cannot, for instance, enter formulae into the boxes or do sums on the data.

From within !GraphEdit you can specify any of 20 different types of graph. You can also choose whether the X, Y or Z scales are linear (the usual one), logarithmic and you can even choose to define your own function for the scale. If you have enough memory (320k) then you can have !GraphEdit and

!GraphBox in two separate windows, and then make changes to your function in !GraphEdit, export it to !GraphBox and see the result. I found this useful for simple curve fitting.

You can also specify whether to display in colour or monochrome. I do not have a RISC-OS colour printer driver and I found that using !PrinterDM with my Epson FX80+ from !Draw gave better results by turning off the grey background and using the monochrome option.

When you have created a data set using !GraphEdit you can save it to disc. The file type is the same as that used by !Edit and it is instructive to reload such a file into !Edit. You will see that the values in the columns are separated by commas. Many spreadsheets have the option of exporting data in this "Comma Separated Value" (CSV) format. More of this later.

The instruction booklet

I do not go along with those people who think that good software should not need an instruction booklet. However, more to fulfil my duty as a reviewer than with conviction I thought I had better have a try without reading the book. It says a lot for Minerva's software that I did not have any real problems but, when I came to read the book I found out that I had missed a lot of good features of the software.

To quote from page 8 "The manual has been sectioned for ease of use and reference, with the aim of introducing all the main features of the software within a few hours." My advice is to read the book and to work carefully through the tutorial section (chapter 3 called "Experimental") and do take "a few hours" to learn how it all works: that way you will have a better appreciation of what can be done and how to do it more easily.

The text is well illustrated with 31 figures including a picture for every one of the 20 types of graph. I have included on the monthly disc two examples of the output from !GraphBox as !Draw files (the trend line and the monthly figures) and a third file which is the result of customising and super-imposition of the two in !Draw. The customised version is printed in the magazine.

For those of you who choose to ignore my advice to read the instructions, at least read the "yellow pages" in the centre of the booklet where you will also find a registration form. If you fill in that form (I have not done so yet!) Minerva will give you 90 days of software support and further support at £30.00 a year. I am going to wait until I have some real problems before I send in my form and then hope I get them solved before the 90 days expire. Minerva's GraphBox is a powerful package which produces results quickly but I still think it will take me some weeks before I find out all the short cuts and how to get the best results.

!GraphBox

This is the heart of the package. You can import data from !GraphEdit directly or from a saved !GraphEdit file. This is the way the 15 examples provided by Minerva can be used. However, like !GraphEdit, !GraphBox will accept data not only in CSV format but also with <Tab> or even spaces separating the columns of data.

I have a file containing the number of new cars registered each month for about 16 years (200 data points). For the statisticians I also have 12 month moving averages which I use as the trend line. I exported this data as a CSV file, a Tab file and even as a spooled file (as sent to a printer) with spaces separating the columns. All these file formats were accepted by both !GraphEdit and !GraphBox without me needing to specify the format I was importing.

You do have to read chapter 4 of the book and make sure that the number of columns of data you are supplying is the number !GraphBox is expecting for the type of graph you want to draw. For example, to draw a line graph with two lines on it you need four (and not three) columns; the x values are repeated in the third column. I found it easier to import into !GraphEdit, make minor adjustments (such as duplicating the x column, choosing the graph type and the option monochrome etc) and then export the data to !GraphBox rather than try to export direct from the file I had saved from my spreadsheet into !GraphBox. I am sure that when I get the spreadsheet right I will be able to shortcut this, but I feel safer at the moment going the long way round.

Graph types

The 20 types of graph available are: Scatter chart (points but no line) / Scatter with error bars / Line graph with points / Line graph with error bars / Bubble chart/Polar scatter chart / Polar line graph / Stacked area chart / Cumulative area chart / Bar chart / 3-D bar chart / Stacked bar chart / Percentage bar chart / Horizontal bar chart / Horizontal 3-D bar chart / Horizontal stacked bar / Horizontal percentage bar / Pie chart / Surface chart / Wire surface chart.

Having imported the data into !GraphBox you can change the type of graph displayed (provided that it is compatible in terms of the number of columns of figures), delete the X (or Y or Z) grid, change the scale function to logarithmic etc, turn off the background, change to monochrome etc, just as you can from within !GraphEdit but it generally takes longer than making the same changes in !GraphEdit.

Because some different types of graph need a different number of columns (or column order) I found it better to make the changes in !GraphEdit and then export into !GraphBox. I have got a 440 so I was able to have several "incarnations" of !GraphBox and !GraphEdit (and one !Draw) on screen at the same time (each incarnation needs about 160k) and play with many graph types from the same data without needing to keep saving to and loading from disc all the time. This is where RISC-OS and a 4Mb memory really come into their own.

!Draw

This is not part of the GraphBox package (it comes with RISC-OS) but this review would be incomplete if I did not mention it. You can drag the "Save" icon directly into !Draw or you can Save to disc: if you save to disc you will find that the filetype is !Draw. The !Draw file created by !GraphBox gives only one size of graph, about A5 landscape. You may think that the lack of a scaling option might be limiting; it is not. The !Draw file consists of a set of drawn objects (i.e. it is not bit-mapped pixel by pixel) so you can take your graph to bits, squash it in the x and y directions independently and change the text style (both font name and size).

One option that I would have liked in !GraphBox is the removal of the points from a line graph,

however, since the points make up the last "object" to be drawn in the !Draw file they are easily deleted from within !Draw. Also, I would have liked more control over the scale intervals used by !GraphBox but I found I could use the !Draw Edit facility to add or remove grid lines selectively.

With a little care you can super-impose line graphs or even bar charts from different data sets. Now I create a dummy scatter graph having only two points (those of you into printing will recognise them as registration marks) but all the grid lines I want, and then super-impose my line graph on it. There is no facility for calculating the regression line of a scatter graph but super-imposition overcomes this problem too. !GraphBox integrates very well with !Draw.

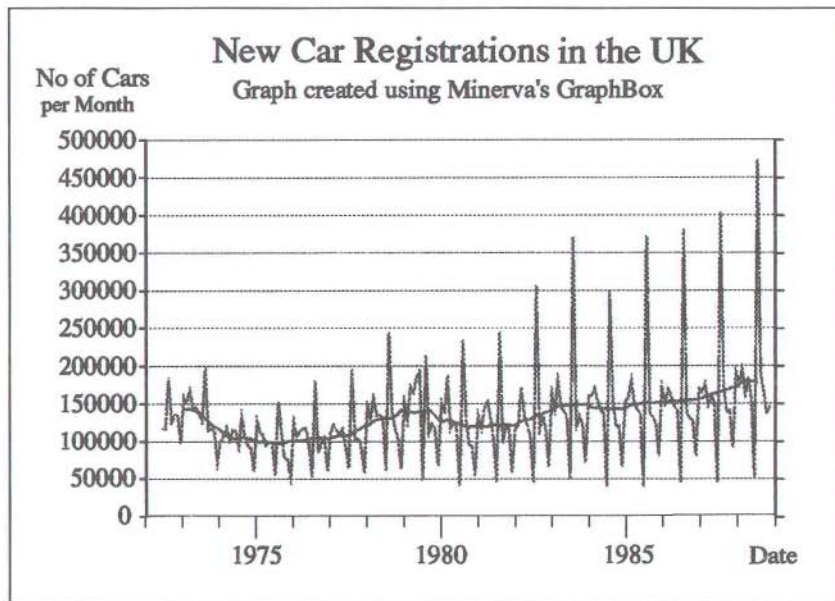
Printing and Desk Top Publishing (DTP)

GraphBox is orientated more towards getting printed results than towards a screen display, but the use of Mode 15 (256 colours) does give fine shading, particularly with 3D bar charts. Those of you with an Integrex or Postscript colour printer will need Acorn's RISC-OS printer drivers that

come as part of their Desk Top Publishing package but, if you do not have the DTP package then to get hard copy from GraphBox you need either an Apple postscript printer or an Epson FX or LQ.

Paul has used !PrinterDM with his Panasonic KXP1081 (FX equivalent) at 216 by 240 dots per inch to produce the result shown below. I have not seen Acorn's DTP package yet but Minerva have a copy and they assure me that the !Draw files created by !GraphBox can be imported into Acorn's DTP giving even better results. They have sent me a print out from that combination and it looks good to me.

With the DTP package you receive printer drivers for the Integrex and Colour Postscript and a new "Font Manager" which draws the characters in the fonts rather than anti-aliasing them. The effect of the new font manager is better printed resolution. The Integrex, ColourPS and HP laser drivers plus the drawn fonts should be available separately from the DTP package. Oak computers can supply a driver for HP plotters. It will be through output applications packages such as these that you will get the best hard copy from drawn applications such as !GraphBox.



Sample Printout using Panasonic KXP1081 (FX equivalent.)

Summary

GraphBox is an impressive package for converting numbers to graphs. Minerva's claim (page 5) is "The GraphBox package is all you will ever need to display figures graphically" and it is substantially true. I would have liked more control from within !GraphEdit of the scale intervals of line graphs and an option to not plot the points, but these are trivial objections when I consider the facilities of !Draw with which it integrates beautifully. I know I shall

use it a lot and that it will grow on me as I get more confident of the short cuts. The greatest limitation of my current system is that I need a multi-tasking spreadsheet. Where can I get one?

Stop Press

I have just been told that Colton's PipeDream Version 3 will be available by the time this is printed and that it is fully multi-tasking. I will let you know how well it integrates with GraphBox as soon as I get my hands on a copy. **A**

Shareware N^o9

Alan Highet 3D Bounce

In the !readme file, the author, Peter Van der Ploeg, says that his original idea was to create a game but he didn't think it was good enough so he now calls it an interactive demonstration. All I can say is he ought to change his mind and persevere as it has the makings of a very good game. The idea is to control a bat with the mouse and hit a ball at the wall of mirrors in front of you. The whole thing takes place in 3D with the ball following a very realistic path including fading slightly as it travels away from you. As you hit the mirrors they break revealing another set of walls behind. I found it very addictive and hope a game does appear from this excellent piece of coding. You can even spin the ball by moving the bat sideways as you hit the ball, but be careful that you don't setting ball shooting off at a tangent as it can be almost impossible to hit it again.

Repton 3 Map Printer

This, as the name suggests, gives a printout of Repton 3 maps. Unfortunately I don't have the game so I can't verify whether it will run under RISC-OS but it should.

Bowls

Here is an implementation of green bowls played from overhead. The jack is set at the beginning of the game and the first bowl is sent by the computer. Halfway down the green is, what appears to be, a wall - which must be avoided. I must admit I've never seen a wall on a bowling green before! A line appears from the mat and revolves round it and you must stop it to show the direction you want the ball to go. After selecting the direction another line appears growing in length to show the power of the

bowl. The ball then is bowled. If it hits the wall or fails to cross a line near the jack the ball instantly disappears and the computer bowls its next ball. This continues until both sides have bowled three balls then the score is displayed.

I'm afraid I wasn't very impressed with this game. I think it needs tidying up in quite a few areas especially the way the balls disappear so fast and the accuracy of the speed and direction. I also feel some on-screen instructions would be useful.

Roller Ball

A pretty platforms game in which you have to manoeuvre a ball up a series of steps and jumps to collect various items. I'm not sure what happens as you progress as I found the control of the ball using the mouse was too difficult for me, and there doesn't seem to be any keyboard alternative. But for those of you with nimble fingers or the time to change the program, this looks good.

Diamonds Are Forever

A graphics demo involving some rotating diamond shapes in a larger diamond pattern. Quite pretty, but nothing special until you list the program and find out how short it is! Some useful ideas in there.

Character Editors 1 & 2

These are two programs to alter the internal character set. Both work very well with easy to use controls and all the characters displayed on screen and altered in real time. The only difference is the little extras they give you. The first allows you to rotate and mirror the character while the second allows you to invert them and spool the results to disc.

Computer Art

Here is a collection of ten pictures, six from P.

Armstrong and four from J. Havercroft. Worthy of mention are 'Muttley' and 'Warrior' from the former and 'Pilot' from the latter.

Rug Generator

This program looks very much like it originated on the Beeb many years ago and is not really something that shows off the Archimedes to its fullest. It generates patterns in various modes but there are no save or print options.

Examine All

With this program you can catalogue a disc to the screen or printer giving all the file information for everything on the disc. Very useful especially with RISC-OS as some files are hidden in applications directories.

Filetypes Utility

This is the source code for a module to make the use and allocation of filetypes rather easier and to instruct files on their method of execution. Unfortunately it does not seem to run under RISC-OS but this is not too much of a problem as the handling of filetypes is now much easier and more filetypes have been allocated.

Filed0 Utility

With this program you can step through some or all the files on a disc and change their filetypes with the option to confirm the change. It works with RISC-OS and is very good although it would be nice to be given the filetype of each file before it is changed.

Tree Display

This gives a graphical display of all the directories and files on a disc. It works very well even with a full disc as the screen is paged. Again, I would like to have seen a print option but I realise this would have been very difficult.

Mode 15 to 12 Conversion

As the name suggests this converts mode 15 pictures to mode 12. There are lots of these programs about but this is the fastest I've seen! From loading the original picture it takes under five seconds to display the mode 12 version. Not only that but it seems to retain the original colours as best as possible with only the sixteen available.

File Recovery

This will recover a deleted file but needs a disc sector editor. There is one on program disc 1.6.

Palette Converter

A simple program but very useful. It turns desktop palette files into a format that can be *EXECed from inside a program. It actually works with Artisan files under RISC-OS although the format of the files is supposed to be different from Arthur 1.2.

NEC Printer Utilities

A printer driver for First Word Plus and a screen dump module.

Dual Fader

With this program you can load screens, or draw them from BASIC, and fade from one to another using either a BASIC or M/C code program. It uses a pseudo-random generator to produce a dot pattern crossfade which is extremely effective. There is a demo program which crossfades three screens, at first quite slowly to show the dot pattern and then at a very respectable speed.

System Delta Plus Export Utility

This allows you to export any data you want from a data file in either a First Word Plus form or with the data separated with tab characters. You actually install it on your working copy of System Delta and call it from the utilities menu. It works quickly and efficiently but under RISC-OS it does not return to System Delta cleanly although this is not really a great problem.

Bank Manager

Those of you who read my review of Home Accounts from Minerva will know I'm on the lookout for a bank accounts program. This almost fits the bill. While it isn't as pretty as Home Accounts it works very well and is considerably cheaper. There are all the usual facilities to add, delete, amend and print and the only thing I would like to see added would be a facility to reconcile your account with the bank statement. This program on its own makes it worthwhile buying the disc.

ADFS Disassembler

This will produce a disassembled source code file in a suitable form for assembly by BASIC. This only works under Arthur 1.2.

Conclusions

This disc contains an enormous variety of programs and I'm sure there is something for everybody. Well worth buying, as is any Shareware. **A**

BBC Compatibility Column

Richard Averill

Through one of the Eureka bulletin boards I was very kindly sent a list of BBC games which run under 65Host on the Archimedes. Thanks! Unfortunately, I do not know who sent the list, so would he/she please like to send me a quick note either through the Archive office or the bulletin board?

I would like to receive more of your interesting contributions! Whether queries, program modifications, information on Archimedes compatibility of BBC software, hints, utilities, or anything else interesting and applicable, please send it to me at the BBC column c/o the Archive office.

If it is more convenient, you can upload the information to Paul Beverley on the Archive bulletin board and he will hopefully pass it on to me. But please don't forget to put your name on all items you send in by post or electronic mail!

The Archimedes DFS-compatible filing system I mentioned in the column previously is very nearly finished and will be released hopefully later on in the year. Quick benchmark tests suggest a 3 to 6 fold speed improvement over the Acorn 1770 DFS system. The DFS does work with the 65Arthur/Tube and 65Host BBC emulators to provide even further BBC compatibility.

I have just finished a RISC-OS desktop version of the DFS reader. It works in a completely different way to before, with options being set through a configure-like window instead of the old irritating menu system. It should hopefully be available on a future shareware.

There is some useful information about the features of the BBC micro implemented by the 65Host emulator on pages 153-155 of the RISC-OS User Guide. The emulator has been slightly improved since the writing of this documentation in that it incorporates far more commands when inside the emulator and now supports sideways RAM in all sockets. Next month I will describe how to use BBC roms in 65Host and present some other useful 65Host tips. If you have any you would like to share with other readers, please send them in.

I am contemplating producing a very fast BBC emulator supporting the DFS filing system, direct screen addressing, i/o poking, OS_Word & 7F disc operations, and possibly a decent mode 7 screen display using a Multi-scan monitor. I will have to investigate the highest speed the emulator could run at first, but of course figures such as 'this emulator runs at 1.36MHz' do not really mean much.

Converting 'Account Book' to the Archimedes

Modifications by Philip Armstrong

Since there is no Archimedes version of "The Account Book" from Apricote Studios, Philip decided to convert his own copy, and has sent details of the modifications required. They can be used to convert Account Book to run in full Archimedes 'native' mode. (People always seem to convert their money-orientated programs to the Archimedes, if nothing else! Richard.)

```
*|> AccountMod
*|Converting "The Account Book"
*|to the Archimedes.
*|Devised by Philip Armstrong
*|Archive BBC Column August 1989
*BASIC
LISTO 1
LOAD "QPRIBAL"
960
SAVE "QPRIBAL"
LOAD "QPRIPAY"
570
SAVE "QPRIPAY"
LOAD "QPRIREC"
430
SAVE "QPRIREC"
LOAD "VAT"
1445
SAVE "VAT"
LOAD "QGRAPH"
370
DELETE 40,60
*|Screen dump in line 100
*|For example:
100 *HARDCOPYFX 1
SAVE "QGRAPH"
```

How to modify your copy

If you have the monthly disc, copy the file '\$.BBCColumn.AccountMod' to the directory in which your Account Book programs are held and type *Exec AccountMod. Otherwise, select your Account Book directory and type in the commands as listed.

Please run these modifications on a backup of the original disc and not on your only copy of the software!!!!

No responsibility is taken by us for any damage caused by the use of these modifications or the use of any other modifications printed in the column. You convert your software at your own risk!

If you have a version of Account Book (e.g. for DFS) other than the one for which these modifications are intended, please write to me at the column and I will put you in touch with Philip.

Conversion details

Originally, Philip thought that he would not be able to convert Account Book completely to the Archimedes due to some 6502 assembly language found in the listing. However, it was evident on further

investigation that the machine code was used to produce a screen dump. So the call to the assembly language can be removed and a screen dump command should be inserted into line 100 of program "QGRAPH" to provide the same effect.

The screendump command will probably be the *HardCopyFX/RX/MX commands provided by the HardCopy module which is machine resident in Arthur 1.2 or in the '\$.Modules' directory of the RISC-OS Applications Disc 2.

There are other screen dump modules available for the Archimedes. For example, one for the Hewlett Packard DeskJet printer is present on the Archive 2.4 program disc and I believe that a friend of Philip's has written a dump module for his own NEC PC8023 printer.

A new data disc is *mounted by line 940 of program "QBREAK" and line 1220 of program "RBREAK". Due to the extra capacity of the Archimedes (especially if you are using a hard disc) it may be more convenient for you to change these into *DIR commands or to delete the lines altogether. **A**

Archimedes' 6502 Emulators

Richard Darby

Having received RISC-OS, I was keen to try out all aspects of the system. Most magazine articles on the new operating system mentioned the new 6502 emulator, 65Host, which supports many aspects of a BBC B micro including direct screen access, sideways RAM/ROMs and, if fitted, the ability to interrogate the user port and 1MHz bus on the I/O Podule. Although it would appear to do all these, it does have two major shortcomings and some bugs.

65Host - no printer

I was very disappointed to discover that it is impossible to print anything, as neither the parallel printer port nor the serial port is supported. This means that programs which use the printer cannot be run in 65Host and the emulator is of little use for the development of BBC micro compatible programs when they cannot be listed on a printer. If you try to list a program on the printer by pressing <ctrl-B> and LIST the program lists on the screen then stops as if the output buffer is full, only <escape> will unlock the system.

Duff DFS

The second shortcoming is the Disc filing system of the emulator. Acorn has invented something called ARFS which appears to be ADFS by another name with all the helpful aspects removed.

Cataloguing the disc results in a list of objects: it is impossible to tell what they are as no attributes are shown. You cannot detect which objects are directories and which are files nor can you tell if they are locked. If you can remember which are directories and you move into a lower directory, on cataloguing again there is no indication of what directory you are in - other than a different list of objects.

The word Dir. appears at the head of the list but no directory name appears against it, this would seem to be a bug in the program. I do not understand why the format of the disc catalogue should be changed, especially as ADFS is implemented unchanged in 65Tube, the other 6502 emulator, and the new format looks nothing like the normal DFS catalogue. The only way file attributes can be seen is by giving the commands *EX or *INFO.

Scrolling bug

In my version of 65Host (0.97/0.13 1 Dec 1988) there is a serious bug involving screen modes 3 and 6. Text is printed normally to a freshly initialised screen until the screen is full, then, as scrolling starts, it would appear to scroll up 2 lines for each new line sent to the screen. Ultimately, the cursor remains at the bottom of the screen while all the text has disappeared off the top. Issuing CLS clears the screen but does not restore the prompt to the home position. This screen clearing problem is also apparent in mode 7 where the cursor and prompt appear near the lower RHS of the screen following a CLS command. However the problem clears itself in this mode when the screen starts to scroll.

Now the good news...

In spite of these shortcomings, the 65Host emulator has some good points, especially the implementation of sideways ROM or sideways RAM. The BASIC provided is BASIC 2 which is appropriate for a model B emulation. The RISC-OS User Guide lists some of the commands available in the emulator module but does not make it very clear that these commands should be given in native Archimedes mode and not while emulating a BBC Micro. In effect these commands allow you to set up the sort of BBC system you require before entering the emulator. The emulator module provides on-line help for its star commands, *HELP <module name> reveals nine commands, four more than are shown in the User Guide, and *HELP <command> gives definitions that are rather more helpful than those in the Guide.

While running the emulator, *HELP will give the names of installed sideways ROMs and *HELP <ROM name> a list of commands just as they would in a BBC micro. Some commands are real but others like *TAPE and *ADFS are dummies, present only to prevent execution errors. Unfortunately, owing to the lack of printer support I have been unable to produce a printed list of these commands. The 65Host emulator appears to run more slowly than the 65Tube emulator.

65Tube

The 65Tube emulator provides a BBC micro second processor environment and appears to be a slightly modified version of 65Arthur, the original BBC emulator. It differs in that it runs HiBASIC 4.3

rather than BASIC 4, and will support 132 column text in VIEW and VIEWSHEET. It does however support the printer port but not the serial port, user port, 1 MHz bus or direct screen access. On-line help for the 65Tube module is virtually non-existent being confined to the start command alone. The User Guide is little better having only 13 lines on this emulator and in common with the Arthur Guide, fails to explain how to load ROM images into the emulator. Fortunately, those upgrading from Arthur can use the same sequence of operations as 65Arthur i.e.

```
*GO F800
LOAD <ROM image> 8000
GO 8000
```

However new users without experience of 65Arthur will be completely lost without a User Guide addendum sheet.

Conclusion

To sum up, the 65Tube emulator works well for the purpose for which it was designed i.e. running BBC micro languages. It does this more quickly than 65Host and therefore should be used for this purpose. The 65Host emulator giving direct screen access, the ability to interrogate the user port, 1 MHz bus and the analogue port of the I/O Podule is clearly aimed at situations where BBC software is used to interface with external equipment e.g. in schools. The failure to support the printer port under these conditions is, I feel, a mistake on Acorn's part, although the non-provision of printer support ensures that languages such as the VIEW family are run on 65Tube rather than 65Host.

I have been told that the development of these emulators is likely to be regarded at Acorn as a low priority activity as it provides backward compatibility rather than on-going development and, as a consequence, modifications and improvements are only made when time allows. If this is so, then improvements may appear unannounced from time to time on later versions of the applications discs.

I would like to urge Acorn to put more time into improving the 65Host by killing the screen scroll bugs, improving the catalogue display and providing printer support. **A**

Techsoft Designer Intro

Alan Highet

On booting up the single disk you are presented with a title page showing the default configuration settings. These include the size of the page and the output device (i.e. the type of plotter or printer). By pressing <N> or <menu>, these settings may be altered and saved to disk. They may also be altered temporarily from within the program itself.

The main program presents you with a blank white screen with a menu down the right hand side and various parameters across the bottom. By moving the cursor to the right hand menu you can select up to 40 different options from 4 menus. These are too numerous to deal with in detail but I will try to cover most of them.

The basic layout

In the centre of the drawing screen is a small box which is the origin (co-ordinates 0,0) and by moving the mouse, the drawing cursor may be moved round the screen with the new co-ordinates, the angle and the distance from the last plotted point being shown at the bottom of the screen. Pressing the left mouse button causes a line to be drawn from the last plotted point to the cursor position, the middle button moves the cursor to a new start point and the right button will make the cursor jump to the nearest co-ordinate to allow for accurate positioning. A grid may be superimposed on the screen to aid drawing along with a grid lock facility causing the cursor to jump from point to point, whilst selecting the fine option makes the cursor jump between grid dots in increments of one tenth grid size.

Element oriented drawing

The program is based on elements and at any time you may choose to draw a new element. The advantage of this system is the ability to deal with each element as a separate item so they may be individually scaled, rotated, moved, mirrored and deleted. During these actions (except delete) you have the option to replace the existing drawing or copy it leaving the original intact. As well as being able to delete the last element or line there is a powerful editing option allowing you to step

through a drawing line by line and insert or delete as much as you want.

Obviously you need more than straight lines and this program seems to give you everything you require. You can draw circles, arcs, tangents, ellipses and rhomboid ellipses with all these options having a variety of methods of entry. For instance the circle option allows you to select the centre and enter the radius from the keyboard or with the mouse. You may also make the circle touch two existing lines or two circles or two arcs or any combination as well as touching two or three points. You only need select the points roughly as the program will intelligently pick the right point on the arc or circle to touch.

Hatching and text

A hatching option is also included allowing you to specify the angle and spacing of all lines and any area may be reselected to allow for cross hatching. There is also a zoom option to help with location of intersecting points although the hunt facility (right mouse button) should do this automatically. Text may be entered in any size, orientation and slant, subject only to the limitations of your plotter and may be represented by a box on screen showing the exact size of the text.

Dimensioning

Dimensioning is taken care of automatically by selecting the two points to dimension between and then the line will appear and can then be dragged out away from the drawing to position it. The arrow-head length and angle, the gap between the leader line and the measured point and whether the dimension lines are internal or external may be changed.

Plotter and printer support

As most drawings would be printed on a plotter there is the facility to change the pens and each pen number is shown on screen with a different coloured line.

This is unfortunately where I can't give you any information as I was only supplied with a demonstration copy which had no print facilities. The instruction book lists quite a few plotters and

Techsoft say they are always adding to the list and to contact them if your plotter is not listed. What I would like to have found out was what kind of results you can achieve with a dot matrix printer. The book says a draft copy is obtainable but the adverts say only a screen dump so if anyone has a full working copy maybe they could let us know.

Conclusions

I think the 'Intro' title is misleading because the

program seems to contain everything you need to achieve a high quality drawing with a very easy to use package.

The handbook is good but the short tutorial section doesn't cover much and experimentation is needed to get the best from the program. Assuming the printing is of a quality to match the program, and I have no reason to think it isn't, then I would recommend its purchase. **A**

BASIC Forum

Clifford Hoggarth

IF only...

I've recently seen several problems in BASIC programs, all traceable to badly structured IF...THEN constructs, so I thought a few comments on these might be of use.

The first and most common is the placing of code following the THEN of a multi-line IF...THEN structure. The THEN statement **absolutely must** be the last statement on the line i.e.

```
IF <condition> THEN
...
ELSE
...
ENDIF
```

If something follows the THEN, the flow of the program is upset since the interpreter does not realise that it is a multi-line structure and treats it as a single line IF...THEN statement. Hence, when the interpreter finds the ENDIF on one of the following lines, it tries to end a structure which has not been created, upsetting the interpreter's idea of the program order.

The same problem occurs if there is an extra ENDIF statement in the program, which may be left when a multi-line IF...THEN is changed to a single line statement, or perhaps after block move/copy operations in the editor.

This can lead to great difficulties in tracing the error in your programs because the error may occur far from where the actual mistake in the program is located. To take an actual example to demonstrate

the point, I was recently converting a window based program to run under RISC-OS, and a problem arose in that after one (and only one) particular menu selection, the computer would lock up completely when the next new window was opened. This occurred even if the program had subsequently been quit.

The problem was eventually traced to an extra ENDIF in the initialisation routine of the program, which was only executed once – when the program was first executed. Apart from the one menu selection, the program otherwise ran without any problems at all, hence it was not obvious in which part of the program the error was situated.

One method of checking for this is to use the SEARCH function (f7) of the BASIC editor. Searching for the two characters, "IF", will list all the lines that contain the word IF or the word ENDIF. It should then be easy to see if the multiple line IF...ENDIFs match since there will not be as many program lines (if any) separating them. Should the number of lines containing "IF" be more than can be displayed on a single screen, press NEXT MATCH (shift-f7) for the next screenful, etc. It is similarly possible to test for correct WHILE...ENDWHILE structures by SEARCHing for "WHILE" and to examine CASE...ENDCASE structures using the search string "CASE".

Unfortunately, however, there is not a simple way of checking REPEAT...UNTIL and FOR...NEXT loops.

If you use indentation (as we all do, of course – do we?!) by inserting a couple of extra spaces at the

start of each line inside a loop then the job of spotting any anomaly will be made easier i.e.

```

WHILE Aflag=TRUE
  REPEAT
    FOR count = 1 TO loop
      IF Bflag=TRUE THEN
        PROCa
        PROCb
      ELSE
        PROCC
      ENDIF
    PROCd
  NEXT count
UNTIL condition=TRUE
ENDWHILE

```

When this program is searched, the start and end lines of a loop are more easily paired because they are indented by the same number of spaces.

LIST IF command

This command is used in a similar manner to the normal LIST command but will only list those lines which contain the string following the 'IF' e.g.

```
LIST IFPRINT
```

will list all lines containing the PRINT statement. The text following the IF can be anything, but note that any spaces immediately following the IF are significant i.e.

```
LIST IF PRINT
```

would find

```
10 IF x=1 THEN PRINT "Hello"
```

but it would NOT find

```
10 IF x=1 THENPRINT "Hello"
```

However, the first version above, with no space after the IF, would display both lines.

Unfortunately, this cannot be used to perform the matched searches shown above. This would have been useful since the search could be limited and/or dumped to a printer if necessary. (The search can be limited in the EDITOR by marking a block using <ctrl-L>, see manual).

Using LIST IFIF will only find IFs and not the ENDIF statements. This is because when the line is

typed in, the BASIC interpreter converts any BASIC command into its tokens before performing the command. (Each command has a token which is only one or two bytes long, saving space in the stored program and speeding up the execution of the program.) Thus, when the search pattern is the word IF, this is tokenised and the LIST IF function searches for lines containing the token, and hence does not match ENDIF or any text with the letters "if" in it. For example if the program was:

```

10 REM SWAP IF a IS SMALLER
20 IF a<b THEN
30 SWAP a,b
40 ENDIF

```

then LIST IFIF will only find the IF command in line 10, but the EDITOR's search function, because it searches for a textual match will find the "IF" in lines 10, 20 and 40.

The same is true of WHILE and CASE.

Base Conversion

Secondly, this month, we will look at a couple of procedures for doing conversions from one base to another.

The first question is how to represent all the possible digits when the base is greater than 10. You will doubtless have seen examples of hexadecimal (base 16) notation, where the "digits" 11 to 15 are represented by the letters A to F. This idea can be extended therefore by using G for 16, H for 17, etc. (see Archive 1.12 p.17)

To avoid confusion, I have only allowed for bases up to 36, i.e. only the digits 0-9 and the letters A-Z.

It follows from the use of letters, that the number must be stored as a string in BASIC, since it stores all numbers as binary, and it appears (to the user) to manipulate numbers using base 10.

This is not a limitation since the only time the base actually matters is during input, and printing of a result. At all other times the value is hidden from the user, so could be stored in any base.

For simplicity and convenience, therefore, the functions below adopt base 10 as the "common use"

base, numbers being converted to and from decimal as required, so that the user sees only the base he or she wishes.

There are two main functions, one to convert from any base to decimal and one for the reverse.

FNbase_to_decimal

FNbase_to_decimal is typically used following input of data. The number may be input from the user as a string and this could then be passed to the function along with the base being used. The string is converted by taking each of the digits in turn, starting with the most significant, extracting them by using LEFT\$.

The value of this digit (in base 10) is added to a running total. This total is then multiplied by the current base and the next character is then converted, until all characters have been translated. The total is multiplied by the base so that the relative positions of the digits have the correct value – each extra digit increases the value by a power of “base” e.g. one, ten, hundred, thousand etc.

The final digit needs no multiplication, being the units digit, and hence the multiplication is performed at the start of the loop (first time through the total is zero).

The number can now be manipulated as a normal decimal variable.

FNdecimal_to_base

When a result needs to be displayed, the number needs to be converted back to the original base. This is done by the second function FNdecimal_to_base. This converts the number to a string consisting of the relevant digits for the base. This is performed using MOD and DIV.

The number is divided by the base and the remainder is noted using the MOD function. This is converted to the relevant letter using INSTR, and becomes the least significant digit of the number. The number is then divided by the base using DIV, effectively shifting all the digits one place right. The process is then repeated until the number has been reduced to zero and all digits have been created.

The final function combines the two and allows direct conversion between any two bases and serves as an example of how these functions can be applied.

Base Conversion Functions

```
number_char$="0123456789ABCD
                EFGHIJKLMNOPQRSTUVWXYZ"
```

```
DEF FNbase_to_decimal (base,number$)
LOCAL number%,temp,temp$
IF base<2 OR base>36 THEN ERROR 1,
    "Invalid base"
```

```
REPEAT number%=number%*base
    temp$=LEFT$(number$,1)
    temp=INSTR(number_char$,temp$)-1
    number%+=temp
    number$=RIGHT$(number$,LEN
        (number$)-1)
UNTIL number$=""
=number%
```

```
DEF FNdecimal_to_base (base,number%)
LOCAL number$,temp
IF base<2 OR base>36 THEN ERROR 1,
    "Invalid base"
```

```
REPEAT
    temp=number% MOD base
    number$=MID$(number_char$,temp
        +1,1)+number$
    number%=number% DIV base
UNTIL number%=0
=number$
```

```
DEF FNbase_to_base (frombase,tobase
    ,number$)
=FNdecimal_to_base (tobase,
    FNbase_to_decimal (frombase
    ,number$))
```

*Next month, a note about the first problem that has arisen with the new version of BASIC that is supplied with RISC-OS. **A***

Arcendium Board Games

John Smith

If you were asked to name a board game that could be played on a computer, you would probably think of chess. Arcendium (from Alien Images) is a board game package, but chess is not included. It's not really surprising as chess games are ten a penny. Arcendium provides other games of skill and strategy: Reversi, Quadline, Draughts and Backgammon.

Arcendium comes in a CD-style plastic case and is supplied with an 11 page instruction booklet which is a model of clarity, describing all of the options without going into unnecessary detail. It begins by explaining how to get the package started and run all the games. This is followed by instructions for each of the four games.

The game has been around for some time now and was written to single-task under Arthur. However, the start-up instructions for Arthur work perfectly well under RISC-OS. Indeed, my copy of RISC-OS arrived mid-way through writing this review and the initial menu is displayed about three times the speed of Arthur when running from RISC-OS!

On loading, the machine's configuration is saved (in RAM, not on disk), CMOS RAM is reset and the game loads. This was against Acorn guidelines under Arthur and is even worse now. Care must be taken to quit all applications before starting Arcendium or any data is lost! If Arcendium is quit legally (not by pressing reset) the user's CMOS RAM is restored and a hard break is performed.

This is the first gripe. The manual does not tell you how to exit legally. The method is obscure and I certainly wouldn't have guessed it – press <Ctrl-Alt-Esc> together! That information is tucked away in a "ReadMe" file. Unfortunately this triple key press only works from the Arcendium menu, which means to quit after playing your game of draughts you must make sure the Arcendium disk is inserted, return to the menu (which does some disk access) and then quit the package proper.

The games are all played using the mouse, but not the WIMP system. However the effect is very pleasing, with a matrix of large 'buttons' at the top

of the screen replacing any use of pop-up menus. In all four games there is a consistent user interface (with necessary slight modifications in Draughts and Backgammon) which provides such facilities as: Taking back and replaying moves, saving games midway through, keeping score and displaying two clocks showing "thinking time" – one per player. There is a help option to ask Archimedes for a suggested move and a list option to show all the legal moves at this point in the game. In all four games, play may be against another player or the Archimedes. Another unusual feature is that of speech synthesis – if selected the computer will say "Thinking" or "Your Move" at the appropriate juncture. These sounds are implemented correctly as sound system modules, so they could be used in your own programs.

Quadline

The simplest game in the suite is Quadline probably better known as Connect-4. It is basically a big version of Noughts and Crosses. It is played on a seven by six grid and the idea is to make a line of four in any direction. However, the player may only "drop" a counter at the top of a column. Gravity being what it is, that counter will then fall as far as it can in a vertical line. Where it lands is the move position.

This game really is easy to learn and simple to play, but be warned – its simplicity is deceptive – when playing versus Archimedes you are quite likely to lose. The simpler the game, the easier it is for a computer to exhaustively check every move.

In Quadline, pieces are placed simply by clicking over the top of the columns. The animation when dropping in the counters is effective, but the sound effects are slightly distracting.

My impression of Quadline is one of a simple game one could get very frustrated with – unless you have the knack of beating the Archimedes when giving it more than one second to think.

Reversi

This is another deceptively simple game. "A minute to learn, a lifetime to master" is the blurb on the box

when you buy the hardware version of the game in your local toyshop where it is known as "Othello".

Play consists of a square board where counters are placed on the board alternately by each player. A counter may only be placed so that one or more of your opponent's counters become sandwiched between the counter you are placing and others of your own colour. After placing a piece the newly-sandwiched opponents pieces are flipped upside-down to show your colour and become yours. The object of the game is to leave your opponent with no counters or, at least, to have more counters than your opponent when the board is full.

Like Quadline, the computer plays a very good game, but it is beatable. The List (and help, occasionally) options are valuable here and the display is very clear. Pieces are placed simply by clicking over the relevant square, so a quick-fire game could be played very easily.

Arcendium's Reversi is certainly the best Othello game I've seen on any computer. It's easy to play, kind on the eyes and the sound effects add to, rather than detract from, the game.

Draughts

I won't try to explain the rules of draughts here – if you don't know them already (unlikely) my explanation wouldn't mean much.

I've never seen a draughts game on a computer before. To be quite frank, I would have thought that draughts wouldn't convert to the VDU as easily as the others. I was wrong. Alien Images have done an excellent job with this one. The basic controls are the same as Reversi and Quadline, but since pieces are moved in draughts, rather than being placed, the procedure to make a move is slightly different. Click on the piece to be moved. Click again on the square to move to. A novel animated arrow "flows" between the two squares. If the piece is to be moved on to take another piece, click on the destination for that move too. Once you are satisfied that the animated path is correct, click on the tick icon. Clicking on the cross icon will allow the move to be made again before finalising it.

Arcendium draughts plays the full game, complete with huffing. Like Reversi, the computer plays a good, but not unbeatable game. As the computer is

thinking, a dynamic "think indicator" is displayed, which tells the user how many moves ahead the computer is thinking. This is because, as in Reversi and Quadline, the quality of Archimede's game is set by limiting it's thinking time rather than setting a skill level.

Like the previous two games, draughts comes highly recommended by me as a very addictive, playable game.

Backgammon

I have never played Backgammon before, so I really had no idea what to expect when I first loaded Backgammon. The Arcendium instruction booklet gives a clear and concise summary of the rules and I was able to start playing right away.

The animation, a uniformly good feature in all four games, applies here too. This time the dice are animated (with a realistic noise, too) as are the counters.

The computer plays a good game based on skill levels rather than on timings, and at level 1 is easily beatable – even by me! All this playability turned the game into an extremely addictive one. So I played it a bit more...

This is when I started noticing the bugs. These ranged from the slightly annoying (The computer speaks "Thinking" after it has thought) to the corruption of the rules (I am assured that only 6 counters are allowed on a single point, Arcendium allows all 15) to the most devastating of bugs, that of the machine refusing to recognise mouse clicks.

I found quite a few bugs like these, so I returned to the other three games and failed to find any other bugs. I intend to write to Alien Images with a complete list of the Backgammon bugs and I will let Paul know when I get a reply.

Conclusions

If you ever want to play one of these board games either by yourself or with a friend then I would recommend this package whole-heartedly. However, if you are considering buying Arcendium with an eye for playing backgammon seriously, I suggest checking with Alien Images for bug-fixes first. Arcendium will however, firmly retain a place in my software collection. **A**

RISC-OS Multi-Sync Graphics

Richard Averill

I have at last received RISC-OS. After the first impressions of the excellent desktop and bundled software, what can RISC-OS do that Arthur can't? In this and other articles I hope to investigate such matters. For example, I hope to describe the RISC-OS built-in dictionary and ultra-high resolution Mandelbrots!

You may like to know that the problem with the break up of the mouse pointer when over the rightmost part of the screen in a multi-sync mode was just a bug in Arthur. This does not occur with RISC-OS!

Another graphics bug of Arthur is not present in RISC-OS. The Arthur OS did not redirect OS_Plot graphics though the VDU drivers if a file was being *spooled. This means that you can now *spool <filename> and save any graphics you would like as with the old BBC or Master.

New Graphics Modes

Firstly, here is a list of the new graphic modes RISC-OS offers over Arthur:

Mode	Resol'n	Colours	Monitor type
21	640x512	256	multi-sync
23	1152x960	2	hi-res mono
24	1056x256	256	normal
25	640x480	2	VGA
26	640x480	4	VGA
27	640x480	16	VGA
28	640x480	256	VGA

'VGA' refers to a monitor supporting the IBM Video Graphics Array PC standard: this includes multi-sync monitors.

It has been mentioned in some articles that one can implement a custom screen mode using a relocatable module. This is true, but having read the very obtuse documentation on how this is achieved, I must conclude that it is not possible until more comprehensive documentation is available!

Modes 21, 23 and 28 are really high-resolution equivalents of mode 15. Note that the x co-ordinate range in mode 24 is from 0 to 2048 instead of 1280,

and the y range in mode 28 is from 0 to 960. Each of these new modes will accept graphics, as will a number modes text-only under Arthur.

I have been waiting a long time for mode 21 to be implemented. With the high resolution of 640x512 and the 256 colours, it decisively makes the Archimedes the most high-specification micro-computer around. And no-one can disagree!

Imagine the superb images mandelbrots or ray-tracers such as Render-Bender would generate while running in this mode! Next month, I hope to be able to present a version of William Doggett's ARM code mandelbrot program running in mode 21, and there were modifications listed in Archive 2.9 pp10-12 to enable Render Bender to run in mode 21.

Multi-sync Compatibility?

RISC-OS should mean that all programs designed to run under the desktop will therefore run in a multi-sync mode: excellent news for compatibility. After all, one does not buy a high-specification monitor just for clarity when using modes 0 to 17! But modifications should not need to be made for expensive applications such as Render Bender (or ProArtisan) to give higher resolution: all software should run in equivalent multi-sync modes.

Famous 'Benders'!

Would Render Bender users like to send some pictures to me c/o the Archive office for 'ray-traced' Shareware disks? Acknowledgements will be made to designers (so please include your name!), and I am especially interested in mode 21 images.

Unfortunately, the sophistication and elegance of mode 21 does bring some disadvantages. Firstly, mode 21 requires a massive 320k of RAM just for the screen display, though this will only be a small inconvenience to 2/4 Mbyte users! Secondly, mode 21 requires a multi-sync monitor and so will not be available to everyone. Thirdly, many more pixels will need to be calculated than in normal 256-colour modes: a mode 21 screen contains four times as many pixels than a mode 13 screen.

The fourth problem is that of speed. The video bandwidth required by mode 21 is very large,

meaning that processing must pause during the period in which the screen display is updated at a frequency of 50 or 60Hz (i.e. 50 or 60 times a second.) The result of this is firstly that the desktop can be seen to operate far slower than the usual lightning speed when redrawing areas of the screen or plotting sprites, and secondly that the screen DMA must be disabled (i.e. the screen will go blank) during disk operations to ensure that no DMA clashes occur. Continuous short-length disk operations can give one a rather bad headache! The new 24 MHz ARM-3 chip with memory cache is said to solve these problems, though the cost of £595 (+VAT no doubt!) seems rather expensive.

How can one assess the time spent by the Archimedes refreshing the screen? The most reliable method is to write some benchmarks in which the only changing variable is the amount of time taken by the VIDC to refresh the screen, as follows:

```

10 REM > CPUtest
20
30 REM (C) Richard Averill, June 1989
40
50 IF MODE<18 THEN MODE 0 ELSE MODE 18
60 n_repeat%=5000000
70
80 DIM code% 100, time%(1,30)
90 FOR opt%=8 TO 10 STEP 2
100 P%=code%
110 L%=code%+100
120 [ opt opt%
130 .decrement_loop%
140 subs r0, r0, #1
150 bne decrement_loop%
160 mov pc, r14
170 ]
180 NEXT opt%
190
200 FOR test_mode%=-1 TO 28
210 IF test_mode%=-1 THEN
220 MODE 0
230 SYS "OS_UpdateMEMC",0,1<<10
240 ELSE
250 MODE test_mode%
260 ENDIF
270 PRINT "Testing mode ";test_mode%
    ;" ...";
280
290 A%=n_repeat%
300 WAIT

```

```

310 TIME=0
320 CALL code%
330 T%=TIME
340 time%(0,test_mode%+1)=T%
350 time%(1,test_mode%+1)=T%-time%
    (0,0)
360 IF test_mode%=-1 THEN
370 SYS "OS_UpdateMEMC",1<<10,1<<10
380 test_mode$="Video/Cursor DMA off"
390 ELSE
400 test_mode$="Mode "+STR$
    (test_mode%)
410 ENDIF
420 NEXT
430
440 *spool CPUfile
450 PRINT "Archimedes video bandwidth
    benchtests"
470 PRINT ;n_repeat%;
    " decrements."
480 FOR mode%=-1 TO 28
490 IF mode%>=0 THEN @%=2:PRINT
    mode%; ELSE PRINT " -";
500 @%=6:PRINT " :",time%(0,mode%+1),
    time%(1,mode%+1)
510 NEXT
520 *spool

```

The machine code assembled in lines 90 to 180 is used as a loop from 5 million (5000000) to 1. The theoretical time taken for this loop will always be the same (it is affected mainly by the time taken for screen refresh.) The reason the loop takes around four seconds and not 2.5 as one might expect (2 x 5 million instructions at 4 MIPS) is that the pipeline is flushed on the branch instruction, making it nearer 4 x 5 MIPS.) The figure of MIPS does not really mean a lot, but having said that, it is very satisfying to know that the Commodore Amiga and Atari ST cannot even manage 1 MIP!

Firstly the screen refresh is disabled by setting bit 10 of the MEMC register (using SWI "OS_UpdateMEMC") to determine the actual speed of the loop without interruptions. Then each mode from 0 to 28 is cycled through and the timing results collected. After each mode has been tested, the text file "CPUfile" is created of

the results of the total loop time and total refresh time (= total time for mode – total time for video DMA off.) This is provided on the monthly disk along with the other listings.

Here are the results of the investigation:

Mode Total(s) Refresh(s)

Screen refresh off:

- 386 0

BBC compatible:

0	403	17
1	402	16
2	420	34
3	420	34
4	402	16
5	402	16
6	403	17
7	420	34

Archimedes:

8	420	34
9	421	35
10	462	76
11	420	34
12	462	76
13	462	76
14	461	75
15	575	189
16	530	144
17	526	140

multi-sync:

18	416	30
19	458	72
20	568	182
21	1108	722
24	846	460

VGA:

25	423	37
26	470	84
27	608	222
28	1456	1070

I have removed the results for modes 22 and 23

since (i) mode 22 is not provided by RISC-OS, and (ii) I do not have an hi-res mono monitor to test mode 23 with! If you do not have a Multi-sync monitor, the results for modes 18 to 21 (and 25-28) will be for mode 0.

The results show that the screen display time depends mainly on the vertical resolution and number of colours available : shown by the comparisons between modes 18, 19, 20, 21 and modes 0, 9, 12, 15 respectively, although 256 colour mode 21 shows a very large display time : four times that of mode 20, its 16-colour equivalent!

There are surprising results for the VGA modes 25 to 28, which offer vertical resolutions slightly lower than modes 18 to 21, yet have significantly longer display times. This is because the frequency of screen refresh is 60Hz instead of 50Hz : i.e. the screen is refreshed 60/50 (1.2) times more than for modes 18 to 20. This is offset slightly by the fact that 16 less graphics rows are displayed, so VGA display time is roughly (multi-sync display time * 50/60) * 480/512. The 256 colour mode again shows slight timing inconsistencies, taking 5 times as long as its 16-colour equivalent!

You may wonder why the timings for modes 2 (160 x 256, 16 colours) and 7 (teletext) are the same as for mode 8 (320 x 256, 16 colours). This is because modes 2 and 7 do not exist. Firstly, the Archimedes cannot display such a low resolution screen as mode 2, and the Archimedes does not have a teletext chip! Mode 8 is used to emulate the modes, and in mode 2 the operating system plots double pixels where specified. This has the odd effect that when the desktop is used in mode 2, the text will be displayed the same size as mode 8, but some graphics drawn (such as lines) will be twice as wide and chunky than those in mode 8!

Finally, the display time for VGA mode 28 with 256 colours and 640 x 480 resolution is nearly 70

times that of mode 0 with just two colours and 640 x 256 resolution! If you were thinking about switching to a VGA mode, and from a multi-sync mode to release that odd bit of memory, think again!

Multi-sync/VGA image displayer

In Archive 2.8 I presented a program that would display mode 20 Multi-sync pictures using interlaced mode 12. Since converting a mandelbrot program to mode 21, I thought that it would be a good idea to enable the program to display images of all multi-sync and VGA modes. And the pictures I had were not of full screen size – they were 512x512 pixels.

This new version will display any screen from modes 18 to 21 and modes 25 to 28, of any width and any height, and it will choose the correct mode to display the picture in automatically from modes 0, 9, 12 or 15 : what convenience!

The monthly disk contains a sample mode 21 Mandelbrot picture ("mandscr_21"). A mode 13 picture of the same Mandelbrot ("mandscr_13") is also included for you to compare! If you have a multi-sync monitor, then you will be able to just *Screenload mandscr21, otherwise use the multi-sync image displayer.

Before running the program, you will need to configure screen memory to the amount that would be required if the screen was displayed in its original mode. See your RISC-OS User Guide pp 453-454 for a complete list.

```

10 REM > M-Scan/VGA
20
30 REM multi-sync/VGA screen
    display emulator.
40
50 REM (C)Richard Averill, June 1989
60
70 REM This program will display any
    Archimedes multi-sync/VGA image in
80 REM interlaced standard
    resolution modes 0,8,12, or 15.
90
```

```

100 OS_Byte%=6
110 IF MODE<18 THEN MODE0 ELSE MODE18
120
130 PRINT "Multi-sync/VGA screen
    display: (C)Richard Averill 1989.""
140
150 INPUT "Hi-resolution image
    filename : " str_image$
160
170 SYS "OS_File",&05,str_image$ TO
    obj_image%,type_image%
    ,len_image%
180 IF obj_image%<>1 THEN PRINT
    str_image$;" is not a file!":END
190 IF (type_image% AND &FFF00)<>
    &FF900 THEN PRINT str_image$;
    " is not an image file!":END
200
210 DIM ptr_image% len_image%+4,
    ptr_vduvars% 16
220 area_cblock%=ptr_image%
230
240 PRINT "If screen display is
    mis-aligned, press <space>
    to re-generate."
250 !area_cblock%=len_image%+4
260 SYS "OS_SpriteOp",&10A,ptr_image%
    ,str_image$
270
280 sprite_number%=area_cblock%!4
290 IF sprite_number%=0 THEN PRINT
    "There are no images in
    this file!":END
300
310 sprite_cblock%=(area_cblock%!8)
    +area_cblock%
320
330 sprite_mode%=sprite_cblock%!40
340 IF sprite_mode%<18 OR
    sprite_mode%>28 OR sprite_mode%
    =24 THEN PRINT "This is not
    a suitable image!":END
350
360 CASE sprite_mode% OF
370 WHEN 18,25 : pseudo_mode%=0
380 WHEN 19,26 : pseudo_mode%=8
390 WHEN 20,27 : pseudo_mode%=12
400 WHEN 21,28 : pseudo_mode%=15
410 OTHERWISE
420 PRINT "Cannot emulate image!":END
430 ENDCASE
440
450 sprite_width%=(sprite_cblock%
    !16)+1
```

```

460 sprite_height%=(sprite_cblock%
                                !20)+1
470 sprite_scanline%=sprite_width%*4
480 sprite_image%=(sprite_cblock%
                                !32)+sprite_cblock%
490 sprite_size%=sprite_scanline%
                                *sprite_height%
500
510 SYS "OS_ReadModeVariable",
                                pseudo_mode%,6 TO ,,
                                screen_scanline%
520
530 DIM ptr_blitimage% 80
540
550 FOR opt%=8 TO 10 STEP 2
560 P%=ptr_blitimage%
570 L%=ptr_blitimage%+80
580 [ opt opt%
590
600 ;r0=start of image
610 ;r1=end of image
620 ;r2=start of screen
630 ;r3=length of one screen line
640 ;r4=length of one image line
650
660 .ptr_lineloop
670 mov r7,r0 ;r7=start of sprite line
680 add r8,r7,r4 ; r8=end of sprite
                                line
690 mov r9,r2 ; r9=start of screen
                                line
700
710 .ptr_copyword
720 ldr r6, [r7], #4 ; get word from
                                line pointer
730 str r6, [r9], #4 ; put word to
                                screen pointer
740 cmp r7, r8 ; pointer=end of
                                sprite line?
750 blt ptr_copyword
760
770 add r2, r2, r3 ; next screen line
                                in r2
780 add r0, r0, r4, lsl #1 ; jump
                                over next sprite line
790 cmp r0, r1 ; end of sprite?
800 ble ptr_lineloop
810
820 mov pc, r14
830 ]
840 NEXT opt%
850
860 REPEAT
870 WAIT
880 WAIT
890 SYS OS_Byte%,&72,2
900 SYS OS_Byte%,&90,0,0
910 TIME=0
920 MODE 128+pseudo_mode%:OFF
930
940 IF sprite_image%>sprite_cblock%
                                +44 THEN
950 FOR colour%=15 TO 0 STEP -1
960 rgb%=sprite_cblock%+44+
                                (colour%*8)
970 COLOUR colour%,rgb%?1,rgb%?2
                                ,rgb%?3
980 NEXT
990 ENDIF
1000
1010 ON ERROR SYS OS_Byte%,&90,0,1
                                :MODE MODE:PRINT REPORT$ " (internal
                                error code ";ERL;")":END
1020
1030 FOR bank%=1 TO 2
1040 SYS "OS_Byte",112,bank%
1050 SYS "OS_Byte",113,bank%
1060 CLS
1070 bank_addr%=FNread_screenstart
1080 A%=sprite_image%+((bank%-1)*
                                sprite_scanline%)
1090 B%=sprite_image%+sprite_size%-
                                ((2-bank%)*sprite_scanline%)
1100 C%=bank_addr%
1110 D%=screen_scanline%
1120 E%=sprite_scanline%
1130 PRINT '"Copying bank ";bank%'
1140 CALL ptr_blitimage%
1150 NEXT
1160
1170 bank%=((TIME DIV 2)MOD 2)+1
1180 REPEAT
1190 WAIT
1200 SYS OS_Byte%,113,bank%
1210 WAIT
1220 SYS OS_Byte%,113,3-bank%
1230 UNTIL INKEY=99
1240 SYS "OS_Byte",21,0
1250 UNTIL FALSE
1260 END
1270
1280 DEF FNread_screenstart
1290 !ptr_vduvars%=148
1300 ptr_vduvars%!4=-1
1310 SYS "OS_ReadVduVariables",
                                ptr_vduvars%,ptr_vduvars%+8
1320 =ptr_vduvars%!8A

```


Jet-Fighter, "an oldie but goodie"

Philip Green

JetPack was always one of my favourite games on the Spectrum. Having owned (and played) JetPack since 1984, I was curious as to how this 16K game had been implemented on the Arch-imeses. Although Minerva have released the game under the name Jet Fighter, it still says that "JetPack is loading" after <shift-break>.

Loading, by the way, is strange. If you click on !Boot from the RISC-OS desktop, the "JetPack is loading" message appears and nothing else: the machine seizes up. If you use <shift-break> it will load (provided your disc is not write protected) otherwise it informs you of the need to re-configure and therefore(!?) to write to disc. If you click on the file "jetfighter" or enter "*jetfighter" from the supervisor, the game will load without using the boot file, without telling you it is loading and without re-configuring – altogether a much faster method of loading.

When the game has been loaded, the colourful title screen and copyright message appear, inviting you to select a one or two player game. If you do nothing, the screen fades to show the high score table. If you still do nothing, the high score table fades back to the start screen and instructions on how to play begin to scroll upwards over the screen. Options are given for switching sound and colour on or off. Whenever you are ready you can press 1 or 2 and the game starts.

Afraid to lose the original high score table as soon as my son got hold of the game I tried to make a backup of the disc but it has Minerva's usual copy protection. However the high scores you get are not saved to disc anyway. Short of leaving the computer on all night there is no way I can prove to my son that I beat his score five minutes after he went to bed!

At the beginning of the game you find yourself standing next to the first stage of a rocket and, using the mouse ('select' switches on the jet motor of your backpack, 'adjust' is the trigger of your gun), you must collect the other stages of the rocket and deposit them on the first. Having done that you must

collect fuel containers which drift down from above and deposit those over your rocket in a similar fashion. All the while you must avoid (or shoot) all the aliens. Contact with any of the aliens is fatal and you only get three lives.

The backdrop of black sky with twinkling stars moves ever so slightly as the highly colourful foreground flashes past. Other items drift downwards and must be grabbed as soon as possible as the score is higher if you manage to catch the object at a greater height. Occasionally you will hear what I can only describe as "boing" for no apparent reason. Then a sphere will come hurtling past and bounce off one of the platforms or the ground, giving the afore-mentioned sound. Some of these balls when caught will add to the amount of time you have left, others when they catch you will cost you some time.

When your rocket is full of fuel you must enter it, whereupon it takes off automatically and any time you have left is converted to points. After disappearing at the top of the screen your rocket reappears and lands and you must start collecting fuel again. As the levels progress the aliens become more difficult to avoid. Some will follow you about, others will shoot you and their speed increases too.

I have a volume control on my monitor. Those who do not must "*configure" the desired sound level before loading, as Minerva only offer on or off. There are not many sounds (at least on the first few levels) but they are good. If you get hit by an alien while standing on a platform the remaining particles bounce and roll to the edge of the platform and down. Very nicely programmed although the sentiment is dubious.

All in all a very nice implementation of a game that I already liked. The plot is simple but I can't help trying time and again to get to the next level and/or beat the highest score. This is the first time I have submitted a review for something I didn't buy but I am sure I would have considered the money well spent if I had bought this. **A**

Dabs PC Shareware Collection

Brian Cowan

We have heard much in this magazine about the concept of Shareware, and I must admit, it is a superb idea. Let me ask you a question: How much of the software that you have purchased do you actually use? In other words, how many of the programs actually live up to your expectations or the adverts. My answer is certainly much under a half although, if pressed, I would admit that maybe my requirements are somewhat perverse.

Shareware is a wonderful way for people to try out programs to see which they would use. David Pilling is doing splendid work in porting shareware across to the Archimedes to run under native mode, but there must be thousands of MS-DOS programs that Archimedes users would like to use. To this end, Dabs Press have brought out their first Shareware collection for the Archimedes running under the PC emulator. There are five 3.5 inch 720k MS-DOS discs containing a broad range of software.

Disc N°1

Disc number one contains two word processors. The first is called Mindreader and I have been wanting to try it out for some time. This program tries to guess the next word you will use. This is the start of a whole new area of applied Artificial Intelligence and, with future developments, it will be particularly useful to people such as solicitors who use a lot of stock phrases in their work. (What about politicians?) I have thought about using such a word processor: the possibility of breaking off writing an article for a cup of coffee and returning to discover the document finished! Unfortunately, Mindreader does not quite do that, but it does make a good attempt at the next word, even if it is not always grammatically correct. In fact, at each stage you are given a list of possibilities.

The second word processor is similar to Wordstar and it distinguishes itself by its remarkable speed. Even under the emulator, it keeps up with the most rapid typing.

Disc N°2

On the second disc there is a clone of Lotus 1-2-3 spreadsheet called "As Easy As...". This is extremely user-friendly, with on-line help and some sample sheets. This disc also contains a huge set of

8086 assembly and debug programs. The package is called A86/D86 and it is not for beginners. These programs are in compressed form and the PKXARC program is supplied for decompression.

Disc N°3

The third is full of games – two chess programs, a maze game, Noughts and Crosses, Backgammon, Checkers and Mahjong. There is also Entrap, better known as Othello, and a Golf game. I must admit that I am not really one for computer games, although I do enjoy the odd Chess session. Neither of the Chess programs is particularly out-standing, although the graphics are quite pleasing.

Disc N°4

The fourth contains mainly printer utilities. Image-print prints text files out in a high quality font. Only one font is provided but others are available. The program called LQ allows near letter quality output on Epson compatible printers. Together with LQ is a calendar program which looks particularly useful. Finally there is a quiz creation program which includes many examples such as a medical quiz and one based on naming the states in the USA.

Disc N°5

On the fifth disc is a flowchart design program which is useful for any graphic layout. There is an "outline processor", PC-Outline which is a type of word processor which allows you to develop ideas, list and sort through them, rearrange them and "flesh them out". This is another of those programs which people may not know about but should! (*I agree, I prepare a lot of the bits and pieces sections of Archive using an outline processor on the Mac. There is a native mode outline processor on Shareware N°13. Ed.*)

One point I particularly like about shareware software is that many programs have copious documentation including full user manuals on the disc. You only print out the manuals you require. There is of course the problem of the speed of the PC emulator. For programs where speed is not important, or programs which are naturally fast, there is no problem. In all, this is an excellent collection of programs: there should be something of interest for everyone. **A**

ANSI - C – Release 2

John Laski

C release 2 is now available from Acorn. I have insufficient knowledge of its internals to offer useful comments on whether or not it produces better code or runs faster than release 1.

Improvements?

I had a ridiculously stupid program for which the release 1 compiler blew up and gave me a stack report of its state when it did so; release 2 sends me verbose reports of how stupid I am, which is an improvement. I do not know how many such obscure bugs have been caught (or how many remain or have been introduced!) I certainly have not encountered any yet, but I have not heavily exercised the compiler.

Extensions

The major extension has been the provision of switches to provide an interface with ASD, the Acorn Symbolic Debugger, which I will comment on below, but what I want to concentrate on is the documentation and, in so far as it can be deduced from this, the target market at which Acorn appears to be aiming.

C versus BASIC

C is a language at the opposite extreme to BBC BASIC in two dimensions. First, it is a language for experienced programmers rather than for beginners. Second, and more importantly, its definition and standardisation are external to Acorn rather than internal. Acorn, therefore, has to conform to an existing culture, rather than define and propagate a new culture.

Compatibility

Acorn have made quite an effort to enable not only C programs but also C system development packages to be imported to the Archimedes without change. AMU(A Make Utility), which is always available in Unix, is provided in the user's toolbox, and some effort is made to recognise and transpose filename formats that are commonly used in other systems to something that makes sense in ADFS. The principal problem is that '.' is used in MSDOS and UNIX to separate two parts of a filename, whereas in ADFS it expresses descent to a subdirectory. The parent directory sign '..' is

translated to '^', and the file descent signs '\(MSDOS) and '\(UNIX) are translated to ADFS's '.' delimiter. I saw no translation rules documented for accessing root directories or library directories, but this is not unreasonable, since ADFS makes the distinction between the user's root and the absolute root.

Documentation

I guess there is a 50/50 chance that one could set up a directory structure on the Archimedes such that one's files would transfer without textual change – quite an achievement. However, the examples in the documentation are misleading: " 'includes.h' translates to 'h.includes' ... 'system.defs' translates to 'system.defs' "; it is unclear at first whether this is not transposed because 'defs' is four characters, and file extensions are only three, or because 'defs' is not one of the recognised extensions for transposition. Only on the next page is it stated: "directory names other than 'c', 'h', 'o' and 's' are not recognised as extensions for transposition".

I may be accused of pedantry but I cite this as indicating that there seem to be rival schools of thought within Acorn so that, in the documentation, the bowsprit gets mixed with the rudder sometimes.

Other indications of this are the bald statements "the -P flag is not documented" and, in the errata slip, "the -zmod option is not provided by the compiler". This second is reasonable, but suggests indecision within Acorn as to how important Pragmas were to be: I should like to know what kind of job it did.

Acorn very fully documents the compiler and loader switches which are very flexible and include those commonly found elsewhere. I thought, at first, that upper-case letters were consistently used for Archimedes specific switches, but this was not fully carried through.

C standards

Acorn makes no attempt to describe the C language, referring to the draft ANSI C document (1986) and, for its PCC mode, K&R C, both of which are widely available, either as original publications or included in a number of books and manuals. I think the draft ANSI should have been provided as an appendix to the documentation.

ANSI requires that local implementations should specify various limits and define a local environment concerned with representations etc. These are generously and sensibly chosen and clearly specified. K&R has, behind it, a bit of a mess of early C features whose use is now deprecated; a full and clear list is given of features not supported, and I imagine that it is only rare programs that will be accepted by current C versions and rejected by Archimedes C and only very old ones that will hit the undefined features.

However, I should have liked to have had the precise syntax that is accepted by Archimedes C and, even more, a collection of example code that would have illustrated good usage. David Pilling's Shareware disks are a good default source for large programs, the Dabhand Guide for small ones.

Libraries

The 'Arthur' library, giving access to particular VDU and SWI facilities, is well documented (and well-chosen). Drawing, keyboard, mouse, sound and Wimp functions are well-defined, and their types well-specified, as are general osarg, osbyte, osfile etc. calls. However, the nature of the types of their parameters are missing from the documentation. They can, of course, be found in the file kernel in the directory arm.clib.h, which is exceptionally well commented. Indeed, this is true of all 17 header files. I was extremely surprised not to have found these, or a selection from them, in the documentation supplied. As it is, serious users will need to type them out for themselves. Incidentally, these files were obviously produced in TWIN, since they have <lf> without <cr> as line separators.

Standard procedure interface

Acorn is proud of its standard procedure interface to access routines written in assembler and other languages and they document it fully and clearly. Although, in its own terms, this is space and time efficient, an internal C procedure interface could be more so. I think that Acorn are mistaken to insist on their (somewhat expensive) standard for all interfaces; it would be easy to provide an import procedure that could enclose C code that was to be available from other languages and an export that could make those calls that might be served by the products of other languages.

Good programs should not hesitate to put common code or code that performs a conceptual unit function in a subroutine. Any unnecessary overhead will put off 'clever' programmers from writing good code.

The Symbolic Debugger

Finally, the Acorn Symbolic Debugger: this requires compiling with the switch -g, which can be qualified, provides copious tables for 'disassembling' and moves up the base at which the code is loaded. Because of the (almost) location-independence of ARM code this is (almost) harmless and so one can be very confident that the code under the debugger works as normal code.

Accessing the identifiers of the various incarnations of a procedure is well thought out and it is possible not only to set break-point but also to 'watch' locations.

I feel unhappy, however, at how to specify commands in the program. This supposes that the lines of a program are numbered and would seem only appropriate to BASIC. Surely, numbers relative to procedure entry point could be used?

One thing missing is a disassembler/discompiler. Of course one should always have one's source program available when debugging, but suppose it were lost or one had got the code from elsewhere? I agree that there is some difficulty in that the ASD is a multi-language tool and that there is a compiler switch to generate assembler code, but I have not seriously used ASD yet and it is unfair to judge it without enough experience to have become really familiar with its use.

Conclusion

Finally, and in summary, this is a very professional package, professionally presented. The criticisms I have made should not be taken to imply that I do not think that this is a very valuable product. (NB: it uses almost a full disk, and serious programs would be impracticable on a single-disk machine.) I hope that it encourages software writers to import and export software, and helps to reduce software costs.

By the way, why and what is 'Brazil'? **A**

(I heard rumours at the Acorn User Show that there is a release 3 of C in preparation and that it is superb – especially the documentation. Ed.)

Noah Paint Professional 16 & 256

Steve Rymarz

Have I found a graphics package to rival ProArtisan or the free Draw and Paint applications supplied with RISC-OS? My package contained two discs and an A5 ring file manual. The discs were Noah 16 and Noah 256 which refers to the number of colours available to the user. However, I can only review Noah 16 as I failed to load Noah 256 on any Archimedes 310's available to me.

I must begin with the manual as I believe it is a good indicator of the care taken by the writers in presenting their product. It was very difficult to maintain concentration while reading as it was full of spelling and grammatical errors. Menu always had an extra 'e' at the end and background lost it's 'g' to become backround! My favourite sentence of all is 'We disposed the functions in this block according to the degree of difficulty, so that it will be easier to understand'. However, ignoring the manual, what do you get in this package?

On loading the program you are faced with a moving set of lines which on pressing a key disappear to reveal a comprehensive menu at the top of the screen and the drawing area beneath. The menu takes the form of four blocks of either 12 or 9 options plus one hidden block and the colour block. The icons are reasonably easy to understand and work with and appear on the screen whenever they are needed. After an icon has been selected the menu blocks disappear to give a whole screen drawing area.

Plain drawing

Using the package to produce drawings was an enjoyable experience. The basic shapes are catered for with adjustable line width and colour. The non standard feature which I found particularly useful was that the shape could be drawn somewhere on the screen and the moved to its final resting place.

Drawing extension

With this block we can add shape filling, filled shapes, grid locking, spray can, magnifier and so on. The magnifier is worth mentioning as it is particularly easy to use. The screen splits into two, as you work on the enlarged half the alterations are seen in true scale on the other half. The last icon in this block is a 'background shelter' switch. With

this activated parts of the screen become protected from permanent overwriting. This allows effects to be tested and erased very easily.

Brushes

Any shape, regular or irregular, can be cut and used as a brush. But, more than that, you can scale it, shear it, rotate it, even wave it around by giving it the number of waves, their height and starting angle! There is also a 3-D perspective which is so clever a whole chapter is devoted to it in the manual.

Options

This takes care of disc operations, exiting and clearing the screen (a little surprising as no prompt is offered on clearing and before you realise it you have lost a sessions work) There is a handy 'help' switch, text and undo icon along with a swap pictogram that allows you to work on a second screen. The text can be scaled and is anti-aliased.

Other points

The colours can be adjusted at will, moved around, or spread together i.e chose red to start and blue to end, you will see all the colours between red and blue spread. Pictures can be merged, areas diffused and palettes copied. You can get into star-command-mode easily, link directly with the Watford Digitiser, print in monochrome (to be updated to colour and 24-pin) and even load an example picture of David Steel if you so wish.

Conclusion

I must compare Noah to the best on the market at present which I believe is ProArtisan. Noah really does not live up to it's title of being a professionally written piece of software. Although it has some good features which I would like to see in other packages, it does not have the feel of a program that would allow me to produce good quality drawings, diagrams or pictures. It would have been useful to have a few examples of 'good' graphic work so that I would be reassured about the possible potential of Noah. However, the greatest drawback that I found was the poor quality of the manual. **A**

Noah 256 does work but, as it says somewhere in the manual, you have to have at least 1.5 mbyte of ram in your computer! Is there anyone with enough ram who would like to do some reviewing for us? Ed.

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